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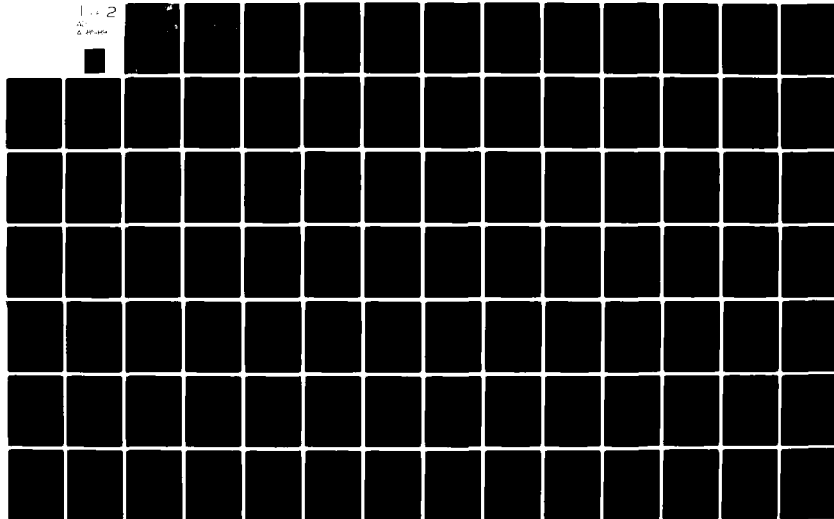
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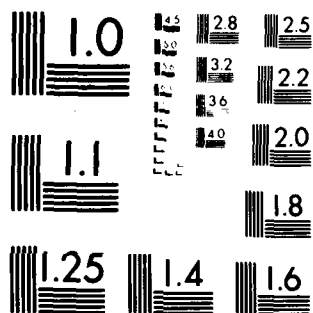
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**THE EFFECT OF COMPENSATION
ON VOLUNTARY SEPARATION OF
NAVY ENLISTED PERSONNEL**

By
D. K. Adie and I. A. Ghazalah

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**FINAL REPORT
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(6) **THE EFFECT OF COMPENSATION
ON VOLUNTARY SEPARATION OF
NAVY ENLISTED PERSONNEL . Volume I.**

By

(10) D. K. Adie I. A. Ghazalah

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EXECUTIVE SUMMARY

The primary objective of this study is to examine the relationship between voluntary separation and the level of compensation in individual Navy ratings, i.e. what effect do changes in compensation have on the voluntary loss in enlisted personnel in a Navy rating.

The basic approach was to relate compensation in a Navy rating to earnings in an equivalent civilian occupation. The compensation in a Navy rating was measured in two ways: (1) *Basic Pay*, and (2) *Regular Military Compensation and reenlistment bonuses*. The relative military-civilian compensation figure of .49 (using Basic Pay), for a rating during a given time period, indicates that the average compensation (Basic Pay only) received by all enlisted personnel in the rating was 49 per cent of the earnings of employees in an equivalent occupation in the private sector. The ratio, of course, would be higher when RMC and reenlistment bonuses are included in military compensation.

Voluntary separation was measured for each rating by computing the quit rate, i.e. the percentage of enlisted personnel in the rating who quit (separated voluntarily from) the Navy during each time period under specified separation codes. (These separation codes are listed in Table 1, Appendix A.)

The study investigated the relationship between *changes* in relative military-civilian compensation and *changes* in the quit rate over consecutive three-month periods from March 1973 to September 1978, a total of

22 quarters. Included in the study were 37 Navy ratings, data on which complied with the requirements of the statistical analysis.

Included in the study were all enlisted personnel (Pay Grades E-1 through E-9) in these 37 ratings who completed up to 143 months of active service. Analysis was conducted separately for enlisted personnel (1) with less than 42 months of service (Personnel Category I), (2) with 42-48 months of service (Personnel Category II), (3) with 49-143 months of service (Personnel Category III), in addition to Category IV, which included all personnel in Categories I, II, and III.

All calculations of compensation and quits by personnel category in each rating and for each of the 22 quarters utilized data from the Defense Manpower Data Center in Monterey, California. Mean Basic Pay and mean RMC plus reenlistment bonuses were computed from basic DMDC data for each personnel category in each of the 37 ratings for each of the time periods and using entitlement information on Basic Allowances for Quarters, Basic Allowances for Subsistence, Federal Income Tax Advantage and reenlistment bonus programs in effect during the study period. All private sector data were obtained from U.S. Department of Labor publications. Appendix B contains detailed information on all data used in the study including descriptions, listings, sources, and processing.

The computed relative-compensation elasticities (listed in Table 1, Chapter II), show a high sensitivity of quit rates to changes in relative military-civilian compensation. For example the relative-compensation elasticities for enlisted personnel with 42-48 months of service (using

Basic Pay as a measure of military compensation) range from -1.980 to -11.802, with a median of -3.688.

The significance of these findings can be illustrated using the elasticity measure of -3.688 for the Equipment Operator rating which shows that a 1% increase in relative military-civilian compensation would result in reducing the quit rate among those with 42-48 months service by 3.688%. During the study period, the mean Basic Pay in the Equipment Operator rating of enlisted personnel with 42-48 months of service was 49% of the earnings in an equivalent civilian occupation. Their quit rate was 38.37% per quarter. Their relative-compensation elasticity of -3.664 indicates that an increase in *the ratio of their average Basic Pay to earnings in an equivalent civilian occupation to 49.49%* (a 1% increase) would have resulted in reducing their quit rate to 36.95% per quarter (3.688 times the percentage increase in relative compensation).

In addition to the relationship between relative military-civilian compensation and the quit rate, the study investigated the relationship between the quit rate and general economic conditions. The business-cycle elasticities show the effect on the quit rate in a Navy rating of an upturn or downturn in general economic activity, in addition to the effect of a rise or decline in relative military-civilian compensation. The computed business-cycle elasticities are listed in Table 3, Chapter II.

Measuring business cycle effects separately from the effects of changes in relative military-civilian compensation allows for flexibility

in adopting policies for dealing with these two specific influences on voluntary separation from service in Navy ratings.

The use of two different measures of military compensation (Basic Pay vs. RMC and reenlistment bonuses) produced consistent results with regard to the effect (on voluntary separation) of relative military-civilian compensation and cyclical fluctuations. However, these results also suggest that the responsiveness of voluntary separation (either to changes in relative compensation or to cyclical fluctuations) may be influenced by the *form* in which a specific amount of compensation is given, whether in Basic Pay or RMC and reenlistment bonuses. The complexity of the relationships involved, however, caution against any definite conclusions in this regard pending further investigation, particularly of the separate effects of individual components of military compensation.

INTRODUCTION

The purpose of this study is to investigate the relationship between compensation and quit (i.e. voluntary separation) rates among enlisted Navy personnel. The study uses an analytical framework that focuses on the economic factors involved in the decision of enlisted personnel in a given Navy rating to voluntarily separate from active service. The analytical framework and the measurement techniques are described in Part I.

In Part II, time-series data covering the period April 1973 through September 1978 are used to estimate the relationship between relative Navy-civilian compensation and the quit rates for enlisted personnel in four categories, defined on the basis of length of active service: under 42 months, 42-48 months, 49-143 months, and a total of all personnel included in the first three ratings, i.e. those who completed up to 143 months of active service.

Elasticities of relative military-civilian compensation are estimated for each of the four personnel categories in each of 37 Navy ratings. The measured elasticities indicate the effect of a percentage decrease in the quit rate that will result from a 1 per cent increase in the relative military-civilian compensation. Two series of measures of relative-compensation elasticities are made: one in which military compensation is measured in Basic Pay only; the other includes Regular Military Compensation (RMC) and reenlistment bonuses. The estimated elasticities indicate a high sensitivity of quits to changes in relative military-civilian compensation.

The relationship between general economic conditions and the quit rate by personnel category and Navy rating is also estimated and the results analyzed.

Appendix A contains analysis of the regression equations used in estimating the relationships, while Appendix B provides listings of the component data as well as detailed description of methods of processing the data for use in the study.

THE ANALYTICAL FRAMEWORK AND THE MEASUREMENT TECHNIQUE

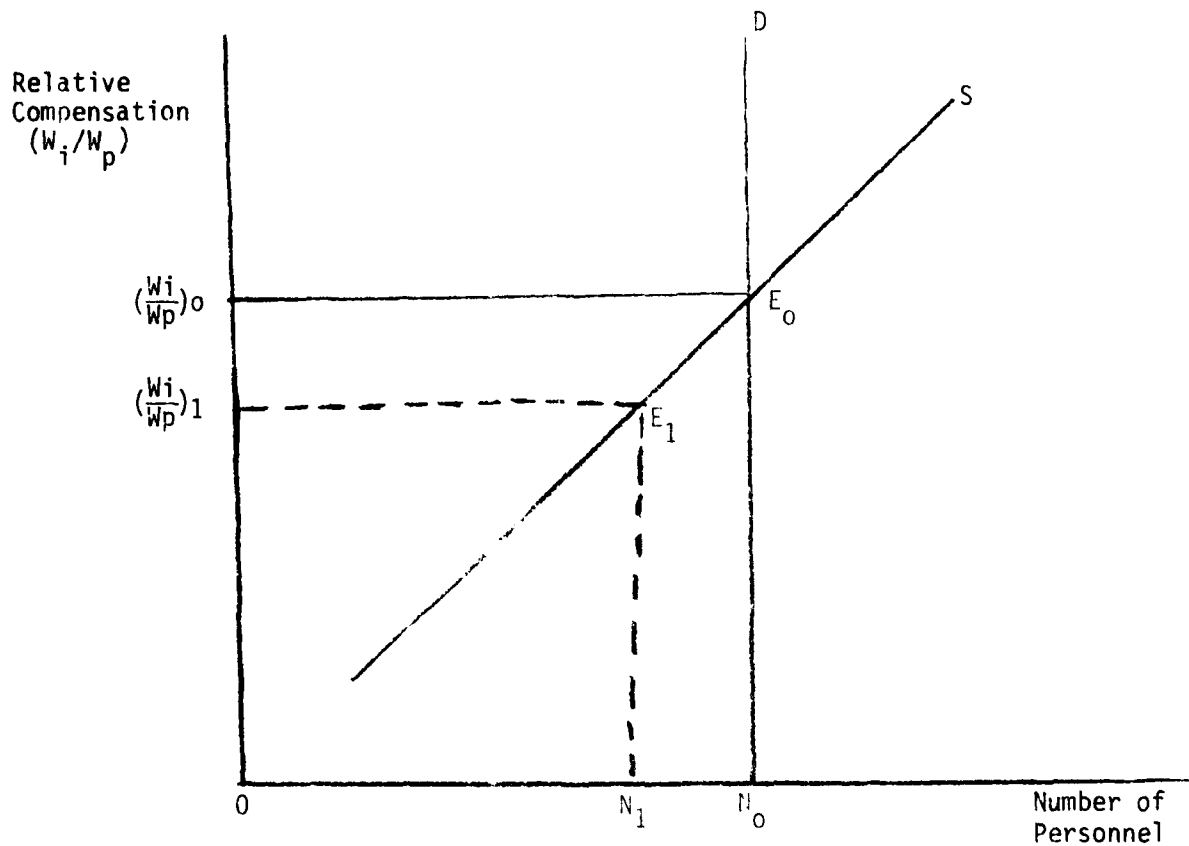
A. The Analytical Framework(i) Compensation and the quit rate

Quits are voluntary separations from service, and as such are a supply of personnel phenomenon. Diagram 1 illustrates the relationship between compensation and the supply of personnel for a specific Navy rating.

The D curve shows the Navy's demand for personnel in the rating. The vertically inelastic demand curve indicates a fixed number of personnel (quota) the Navy sets for the rating. The S curve shows the number of personnel willing and able to serve in the rating at different levels of compensation, as measured on the y-axis. Compensation is expressed in terms of an index: the ratio of remuneration for the rating to remuneration for an equivalent occupation in the private sector.

$(\frac{w_i}{w_p})_0$ shows the level of relative compensation at which the supply of personnel will match the demand, i.e. the quota N_0 for the rating. Assume this equilibrium condition exists at the beginning of the time period. A subsequent decline in relative compensation such as to $(\frac{w_i}{w_p})_1$ results in a decrease in the number of personnel willing to stay in service from ON_0 to ON_1 , i.e. $N_0 - N_1$ personnel separate voluntarily from the service. The quit rate is:

DIAGRAM 1
COMPENSATION AND THE SUPPLY OF PERSONNEL
FOR A NAVY RATING



W_i = military compensation

W_p = civilian compensation for an equivalent occupation in the private sector

$$Q_0 = \frac{ON_0 - ON_1}{(ON_0 + ON_1)/2}$$

In order to maintain manpower size at N_0 in the face of relative compensation $(\frac{W_i}{W_p})_1$, the Navy's net procurement rate for the rating would have to be maintained at the rate Q_0 . Alternatively, the Navy could reduce the quit rate (and hence the necessity for net procurement) by raising the relative compensation rate above $(\frac{W_i}{W_p})_1$. For any given relative compensation rate between $(\frac{W_i}{W_p})_0$ and $(\frac{W_i}{W_p})_1$, with N_0 as the required number of personnel (i.e. quota), the quit rate and the relative compensation rate are *inversely* related.

(ii) General Economic Conditions and the Quit Rate

In addition to relative military-civilian compensation, quits from a Navy rating are influenced by the availability of employment opportunities in the private sector. The number of job vacancies in the private sector increases during an upswing and decreases during a downturn.

Labor market conditions in the private sector provide the basis for this positive relationship between cyclical movements and the level of employment opportunities. Workers dislike layoffs and desire to reduce the uncertainty associated with their incomes. Firms will be willing to reduce worker risk by offering employment with less risk of layoffs in return for a lower wage bill.

The profit-maximizing strategy for business firms in this situation is to set a pre-announced wage path that does not respond to period by

period fluctuations in aggregate demand, prices, or employment. Faced with this situation, mobile or temporary employees switch jobs more readily and with less risk in economic upturns than in economic downturns, so the quit rate increases in expansions and falls in contractions.¹

Therefore, an upturn in general economic conditions will be marked by improved alternative (i.e. private sector) employment opportunities for Navy personnel; while a downturn in the business cycle will signal a decline in the number of alternative job opportunities. Hence, other things remaining the same, we should expect a *positive* relationship between general economic conditions and the quit rate in a Navy rating. For a given relative military-civilian compensation rate in a Navy rating, the quit rate should be higher during a period of general economic expansion and lower in a period of contraction. In Diagram 1, this can be represented (not shown) by a rightward shift of the S curve in a business cycle upturn, and a leftward movement of the curve during a downturn.

The *positive* relationship between the quit rate and general economic conditions renders it more costly (i.e. a higher relative military-civilian compensation rate is required) to maintain a given quit rate

¹See Martin Neil Paley, "Wages and Employment under Uncertain Demand," Review of Economic Studies, June 1974, pp. 37-50.

during cyclical upswings in the economy than during periods of contraction.² For policy purposes, therefore, it is useful to distinguish the effect of the business cycle on the quit rate for a Navy rating from the effect of changes in relative military-civilian compensation.

General economic conditions can be measured by the quit rate in all manufacturing. The quit rate for all manufacturing in the private sector is closely related to the business cycle: rising with economic expansion (characterized by increased job opportunities) and falling with a downturn in the business cycle, when job opportunities decline (and the concern for job security discourages quitting). The quit rate for all manufacturing scores high as an indicator of economic activity: 71 out of 100 on the scale adopted by Moore and Shiskin,³ compared to 62 for the unemployment rate, 74 for GNP in current dollars, and 69 for total non-agricultural employment.⁴

²See Herbert S. Parnes, "The Labor Force and Labor Market," Employment Relations Research (New York, Harper and Brothers, 1960), p. 36, for a discussion of the effect of the business cycle on employer cost of maintaining low quit rates.

³See Paul A. Armknecht and John F. Early, "Quits in Manufacturing - A Study of their Causes," Monthly Labor Review, November 1972, p. 31.

⁴Geoffrey H. Moore and Julius Shiskin, Indicators of Business Expansions and Contractions, National Bureau of Economic Research, Columbia University Press, New York, 1967, Occasional Paper 103, p. 107, 38.

B. The Measurement Technique

The analytical framework described above can be used to devise measures of the response of enlisted personnel in specific Navy ratings to economic incentives. In this study, regression analysis techniques are used to determine the specific parameters of the relationship *between* the quit rate in a specific Navy rating *and* the two independent variables: *general economic conditions* and the relative military-civilian compensation rate $(\frac{W_i}{W_p})$.

For a specific Navy rating, the empirical relationship can be estimated using the following equation:

$$Q_i = a Q_m^b \left(\frac{W_i}{W_p}\right)^c \quad (i)$$

where Q_i = the quit rate for Navy rating i

Q_m = the quit rate for all manufacturing (a proxy for general economic conditions)

W_i = the compensation rate for Navy rating i

W_p = the compensation rate for an occupation (or an occupational classification) in the private sector equivalent to Navy rating i.

In natural log (ln) form, Equation (i) becomes:

$$\ln Q_i = \ln a + b \ln Q_m + c (\ln W_i - \ln W_p) \quad (ii)$$

In Equation (ii), ln a is the natural log of the quit rate that would exist in Navy rating i if the quit rate for all manufacturing were

one per cent and there were no difference in compensation between Navy rating i and an appropriately chosen equivalent occupation (or occupational classification) in the private sector. The value of ln a, therefore, reflects effects other than those of general economic conditions and the compensation differential.

The parameter b in Equation (ii) is an elasticity of response in the quit rate of Navy rating i to fluctuations in general economic conditions. For example, a value of 1.2 for b indicates that for one per cent increase in Q_m (the quit rate for all manufacturing), Q_i (the quit rate for Navy rating i) increases by 1.2 per cent.

The parameter c is an elasticity of response in the quit rate in Navy rating i to changes in relative compensation $\frac{W_i}{W_p}$. A value of -2.1 for c, for example, indicates that a one per cent increase in relative compensation $\frac{W_i}{W_p}$ would decrease the quit rate in Navy rating i by 2.1 per cent.

II

APPLICATION AND ANALYSIS OF RESULTS

A. Application

The measurement techniques described in Part I were applied to time series data on enlisted personnel in pay grades E-1 through E-9 in 37 Navy ratings. The period covered extended from April 1, 1973 through September 30, 1978--a total of 22 quarters.¹

For purposes of the study, personnel in each Navy rating were divided into the following four categories, based on length of service at the start of each quarter:

Personnel Category I: Those who completed less than 42 months of service.

Personnel Category II: Those who completed between 42 and 48 months of active service.

Personnel Category III: Those with between 49 and 143 months of service.

Personnel Category IV: All personnel included in Categories I, II, and III (those who completed up to 143 months of active service).

¹Data requirements dictated the choice of the Navy ratings studied. Minor changes in the study period (originally intended to be January 1, 1973 to December 31, 1978) became necessary either because of incomplete data or in order to use uniform time periods. Data obtained from the Defense Manpower Data Center (Monterey, California) were on semi-annual basis for the period January 1973 through June 1974, and quarterly for the period July 1975 through December 1978. The last quarterly data series were incomplete and hence were omitted. All semi-annual data were converted to quarterly data. The conversion procedure required the loss of the first quarter of 1973. See Appendix B for a description of this procedure.

Two separate measures of military compensation were used for each personnel category in each of the 37 ratings:

1. Basic Pay
2. Regular Military Compensation (comprised of Basic Pay, Basic Allowance for Subsistence, Basic Allowance for Quarters, and Federal Income Tax Advantage) and Bonuses, which included payment under the Regular Reenlistment Bonus (RRB), the Variable Reenlistment Bonus (VRB), and the Selective Reenlistment Bonus (SRB) programs as applicable for any of the time periods in the study.

The following two regression equations (in natural log form) were applied to the 22-period quarterly data on each of the four personnel categories in each of the 37 Navy ratings:

$$\ln Q = \ln a + b \ln Q_m + c \ln (W_B/W_P) \quad (1)$$

and

$$\ln Q = \ln a' + b' \ln Q_m + c' \ln (W_R/W_P) \quad (2)$$

where Q = the quit rate in the personnel category in the Navy rating.

Quits are defined as voluntary separations on the basis of a selected list of Interservice Separation codes (see Table A-1, Appendix A, for a list of these separation codes).

Q_m = the quit rate for all manufacturing. This rate of voluntary separation in manufacturing provides a measure of general conditions in the economy. The quit rates for

all manufacturing in the private sector are closely related to the business cycle.

The data used are those published by the U.S. Department of Labor--Bureau of Labor Statistics in Employment and Earnings in Table D-1, "Labor Turnover Rates in Manufacturing".

W_B = Basic Pay. Mean basic pay for the personnel category in the Navy rating.

W_R = Regular Military Compensation (RMC) and Bonuses. Mean Regular Military Compensation (RMC) and bonuses for the personnel category in the Navy rating.

(See Appendix B for a detailed explanation of methods of computing bonuses.)

W_P = Private sector earnings in the Standard Industrial Classification (SIC) equivalent to the Navy rating. (See Appendix A, Table A-2, for a list and description of SIC codes used for each of the 37 Navy ratings included in the study.)

B. Analysis of the Results

Table A-3 (Appendix A) provides an analysis of the results of fitting the two regression equations to the time series data on each of the four personnel categories in each of the 37 Navy ratings.

For each of the Navy ratings, the first row under each personnel category shows the results of applying Regression Equation (1) where only Basic Pay is used as a measure of military compensation; while the second row shows the results of applying Equation (2), where Regular Military Compensation (RMC) and reenlistment bonuses are used as a measure of military compensation.

For Personnel Category III in Aviation Firecontrol Technician (AQ) rating, for example, these results are as follows:

$$\ln Q = -0.020 + .148 \ln Q_m - 2.776 \ln W_B/W_P \quad (1)$$

and

$$\ln Q = 0.137 + .476 \ln Q_m - 3.127 \ln W_R/W_P \quad (2)$$

The constant term, e.g. 0.137 in Equation (2), is the natural log of the quit rate that would exist for Personnel Category III (those with between 49 and 143 months of active service) in this rating if the quit rate for all manufacturing were one per cent and if there were no differential in the applicable Navy-private sector compensation. The parameter a (or a'), therefore, captures the average quit rate that is attributable to factors not included in the regression equation, namely factors other than general economic conditions and the ratio of military compensation for the rating to earnings in the equivalent occupational classification in the private sector.

The parameter b (or b'), the coefficient of $\ln Q_m$, is an elasticity of response in the quit rate of the applicable personnel category in the Navy rating to general economic conditions (as measured by changes

in the quit rate for all manufacturing). The value of .148 in Equation (1) indicates that for a one per cent increase in Q_m (the quit rate for all manufacturing), Q (the quit rate for Personnel Category III in the AB rating) increases by .148 per cent. The equivalent relationship in Equation (2) (where RMC and bonuses are used to measure military compensation) is an increase of .476 per cent for a one per cent increase in the quit rate for all manufacturing.

Parameter c (or c') (the coefficient of $\ln W_B/W_P$ or $\ln W_R/W_P$ respectively) is an elasticity of response in the quit rate of the personnel category in the Navy rating to changes in this relative Navy-private sector compensation. The value of -2.776 in Equation (1) indicates that for a one per cent increase in the ratio of their compensation (as measured by Basic Pay) to the private sector earnings for the equivalent civilian occupational classification, the quit rate for Personnel Category III in the AQ rating decreases by 2.776 per cent. The equivalent value of -3.127 in Equation (2) indicates a 3.127 per cent decrease in this quit rate for a one per cent increase in the relative compensation ratio (when military compensation is measured by RMC and reenlistment bonuses).

(i) Relative Compensation Elasticities

The relative compensation elasticities estimated for each of the four personnel categories in each of the 37 Navy ratings are listed in Table 1.

The estimated elasticities are high. Only two among the total 95 calculated fall below 1.00 and both are for Personnel Category III

TABLE 1

RELATIVE-COMPENSATION ELASTICITIES FOR NAVY RATINGS
BY PERSONNEL CATEGORY

	Personnel Category I		Personnel Category II		Personnel Category III		Personnel Category IV	
	(c)	(c')	(c)	(c')	(c)	(c')	(c)	(c')
<u>Navy Rating</u>	W_B/W_P	W_R/W_P	W_B/W_P	W_R/W_P	W_B/W_P	W_R/W_P	W_B/W_P	W_R/W_P
AR Aviation Roatswain's Mate	*** -3.639 (-3.42)	*** -3.532 (-3.36)	** -2.245 (-2.20)	-0.922 (-0.78)	** -1.617 (-2.47)	** -1.736 (-2.31)	*** -2.923 (-4.12)	*** -2.937 (-3.20)
AC Aircontrolman	-4.768 (-1.79)	-5.568 (-1.24)	-9.252 (-2.60)	-0.579 (-0.29)	-3.596 (-1.43)	-0.078 (-0.05)	-5.886 (-3.39)	-1.134 (-0.59)
AD Aviation Machinist's Mate	*** -7.986 (-4.19)	*** -9.311 (-3.26)	*** -3.529 (-4.15)	-2.688 (-2.40)	** -1.799 (-3.65)	*** -1.873 (-3.34)	*** -7.446 (-5.69)	*** -9.362 (-4.08)
AE Aviation Electrician's Mate	-3.326 (-1.18)	-4.029 (-1.54)	*** -3.572 (-4.35)	-1.289 (-2.37)	*** -2.583 (-3.59)	*** -1.729 (-3.91)	*** -6.313 (-3.70)	* -4.415 (-1.84)
AG Aerographer's Mate	-1.117 (-0.48)	-0.042 (-0.01)	** -5.339 (-2.41)	-1.235 (-0.79)	*** -4.159 (-4.60)	*** -3.916 (-5.35)	** -3.011 (-2.43)	-1.169 (-0.81)
AK Aviation Storekeeper	** -8.895 (-2.54)	-4.749 (-1.26)	-3.128 (-1.60)	-2.446 (-1.37)	** -4.381 (-2.14)	-3.285 (-1.46)	*** -5.961 (-4.38)	*** -5.487 (-4.24)
AM Aviation Structural Mechanic	*** -6.646 (-3.52)	*** -8.188 (-2.97)	*** -2.944 (-3.34)	-1.622 (-1.83)	** -2.391 (-2.37)	* -2.179 (-1.99)	*** -5.429 (-3.49)	** -6.376 (-2.65)
A0 Aviation Ordnanceman	*** -5.919 (-3.40)	** -5.066 (-2.12)	** -3.347 (-2.47)	-0.549 (-0.65)	*** -2.004 (-3.24)	** -1.214 (-2.81)	*** -5.226 (-3.16)	* -3.714 (-1.79)

Personnel Category I Personnel Category II Personnel Category III Personnel Category IV

Navy Rating	Personnel Category I		Personnel Category II		Personnel Category III		Personnel Category IV	
	(c)	(c')	(c)	(c')	(c)	(c')	(c)	(c')
	W_B/W_P	W_R/W_P	W_B/W_P	W_R/W_P	W_B/W_P	W_R/W_P	W_B/W_P	W_R/W_P
AQ Aviation Firearm Technician	*** -7.065 (-4.07)	*** -8.357 (-4.00)	* -3.227 (-1.98)	** -1.458 (-2.10)	** -2.776 (-2.16)	*** -3.127 (-3.11)	*** -3.559 (-3.60)	*** -2.973 (-3.88)
AT Aviation Electronics Technician	*** -4.761 (-4.90)	*** -5.007 (-4.21)	-1.339 (-1.16)	-1.039 (-1.05)	** -1.695 (-2.76)	* -1.241 (-1.99)	*** -2.630 (-3.94)	*** -2.326 (-3.06)
AW Aviation Antisubmarine Warfare Technician	*** -8.174 (-3.39)	*** -11.923 (-3.80)	* -1.908 (-1.96)	-0.878 (-1.41)	** -1.891 (-2.17)	*** -1.641 (-3.07)	* -2.994 (-1.82)	-2.498 (-1.52)
BM Boatswain's Mate	*** -9.859 (-3.74)	*** -10.737 (-3.23)	* -3.181 (-1.83)	-1.375 (-1.05)	*** -2.166 (-3.62)	-1.101 (-1.54)	*** -6.630 (-4.22)	*** -5.639 (-3.45)
BT Boiler Technician	*** -5.097 (-4.21)	*** -6.471 (-3.72)	*** -6.484 (-3.52)	** -4.854 (-2.77)	** -3.645 (-2.09)	** -3.061 (-2.24)	*** -5.193 (-4.65)	*** -6.300 (-5.31)
BU Builder	-1.360 (-0.52)	-1.861 (-0.60)	*** -4.546 (-4.11)	** -1.895 (-2.17)	*** -4.507 (-3.08)	*** -4.136 (-4.03)	*** -4.859 (-6.05)	*** -4.971 (-4.23)
DP Data Processing Technician	* -2.552 (-2.02)	* -3.097 (-1.93)	*** -6.442 (-5.04)	*** -3.579 (-3.87)	-1.977 (-1.52)	-0.999 (-0.83)	*** -6.525 (-4.76)	** -5.226 (-2.78)
DS Data Systems Technician	-1.258 (-1.03)	-1.028 (-0.81)	-1.228 (-1.12)	0.306 (0.32)	0.241 (0.55)	0.226 (0.59)	-0.289 (-0.75)	-0.267 (-0.66)
DT Dental Technician	-0.210 (-0.04)	2.371 (0.44)	* -3.738 (-1.75)	-0.178 (-0.09)	** -2.049 (-2.09)	** -2.007 (-2.78)	* -3.235 (-1.79)	-0.715 (-0.39)

Personnel Category I Personnel Category II Personnel Category III Personnel Category IV

Navy Rating	Personnel Category I		Personnel Category II		Personnel Category III		Personnel Category IV	
	(c)	(c')	(c)	(c')	(c)	(c')	(c)	(c')
	W_B/W_P	W_R/W_P	W_B/W_P	W_R/W_P	W_B/W_P	W_R/W_P	W_B/W_P	W_R/W_P
EM Electrician's Mate	*** -5.458 (-6.52)	*** -6.365 (-5.81)	*** -3.133 (-2.68)	-1.961 (-1.43)	*** -3.903 (-2.45)	*** -2.786 (-2.90)	*** -3.817 (-7.48)	*** -2.617 (-3.18)
EN Engineman	** -2.515 (-2.53)	** -2.628 (-2.69)	-0.954 (-1.11)	-0.599 (-1.62)	** -0.638 (-2.38)	* -0.493 (-2.05)	** -1.641 (-2.17)	-1.145 (-1.41)
EO Equipment Operator	-0.946 (-0.72)	-0.730 (-0.46)	*** -3.688 (-4.00)	-2.339 (-1.99)	*** -2.794 (-3.40)	** -2.439 (-2.57)	** -1.723 (-2.24)	* -1.603 (-1.85)
ET Electronics Technician	*** -9.130 (-4.89)	** -8.512 (-2.40)	*** -11.802 (-3.62)	-1.979 (-1.08)	*** -2.632 (-4.11)	*** -2.058 (-2.53)	*** -10.865 (-6.82)	* -5.697 (-1.84)
FT Firecontrol Technician	* -5.841 (-1.96)	-5.734 (-1.23)	*** -7.561 (-5.81)	*** -3.317 (-5.02)	*** -6.090 (-3.22)	*** -3.385 (-3.10)	** -7.123 (-2.84)	** -4.132 (-2.10)
GM Gunner's Mate	* -5.641 (-1.90)	-1.836 (-0.65)	** -6.617 (-2.66)	-0.425 (-0.30)	* -4.330 (-1.83)	-0.981 (-0.63)	** -5.275 (-2.47)	-1.836 (-1.10)
HM Hospital Corpsman	-5.254 (-1.56)	-3.713 (-0.82)	*** -10.237 (-2.78)	-3.190 (-0.78)	** -2.364 (-2.40)	*** -6.998 (-3.39)	*** -6.932 (-4.00)	* -5.622 (-2.00)
HT Hull Maintenance Technician	*** -6.737 (-4.70)	*** -5.768 (-2.86)	*** -4.485 (-3.37)	-0.944 (-1.19)	*** -6.64 (-5.42)	*** -3.102 (-3.90)	*** -6.969 (-9.86)	*** -4.699 (-4.64)
IC Interior Communications Technician	*** -6.603 (-2.98)	-4.288 (-1.13)	*** -10.563 (-3.73)	-1.826 (-1.32)	** -5.114 (-2.63)	*** -2.025 (-2.11)	** -3.817 (-1.58)	*** -3.776 (-2.52)
MM Machinist's Mate	** -6.089 (-2.14)	** -5.905 (-2.26)	* -4.963 (-1.79)	-2.153 (-0.78)	-0.419 (-0.18)	-0.158 (-0.11)	*** -8.116 (-4.42)	-2.394 (-1.02)

Personnel Category I Personnel Category II Personnel Category III Personnel Category IV

Navy Rating	(c) W_B/W_P	(c') W_R/W_P	(c) W_B/W_P	(c') W_R/W_P	(c) W_B/W_P	(c') W_R/W_P	(c) W_B/W_P	(c') W_R/W_P	(c) W_B/W_P	(c') W_R/W_P
MR Machinery Donatiman	*** -8.266 (-3.72)	*** -8.495 (-2.64)	*** -7.652 (-3.26)	-0.992 (-0.38)	-2.439 (-1.85)	* -1.583 (-1.64)	*** -8.067 (-5.48)	* -5.335 (-1.83)		
OS Operations Specialist	** -2.590 (-2.56)	* -2.371 (-1.97)	* -2.691 (-2.023)	-0.836 (-0.71)	*** -1.683 (-3.17)	** -1.436 (-2.27)	*** -1.909 (-3.52)	** -1.339 (-2.07)		
PH Photographer	*** -3.743 (-3.08)	** -3.584 (-2.44)	* -3.312 (-1.89)	-2.371 (-1.41)	** -2.203 (-2.51)	-1.067 (-1.06)	*** -2.810 (-3.19)	* -1.904 (-1.83)		
PI Personnelman	** -3.897 (-2.17)	** -4.182 (-2.36)	** -3.141 (-2.69)	-2.271 (-1.58)	*** -1.704 (-3.14)	** -1.685 (-2.25)	*** -3.372 (-3.28)	** -2.796 (-2.27)		
PR Aircrew Survival Equipmentman	** -4.298 (-2.20)	-3.132 (-1.46)	** -5.546 (-2.63)	-3.238 (-1.68)	*** -3.477 (-3.07)	** -2.575 (-2.53)	*** -5.039 (-3.45)	* -3.018 (-2.02)		
QM Quartermaster	*** -3.188 (-3.15)	** -3.244 (-2.68)	*** -3.557 (-2.91)	-1.639 (-1.31)	** 01.103 (-2.10)	* -1.026 (-1.73)	*** -2.748 (-3.95)	*** -2.671 (-2.99)		
RM Radioman	** -3.261 (-2.69)	** -3.362 (-2.82)	*** -3.582 (-4.07)	-1.374 (-1.41)	* -0.970 (-1.93)	-0.533 (-1.17)	*** -3.062 (-4.30)	** -2.352 (-2.65)		
SH Ship's Serviceman	*** -3.472 (-3.68)	*** -3.584 (-3.31)	** -3.042 (-2.85)	-2.237 (-1.71)	*** -1.991 (-2.76)	** -2.641 (-2.82)	*** -2.827 (-4.85)	*** -3.351 (-3.72)		
SK Storekeeper	-6.76 (-1.63)	-3.449 (-0.54)	-4.106 (-1.20)	-0.037 (-0.05)	*** -6.375 (-3.90)	0.545 (0.16)	** -6.692 (-2.17)	* -2.641 (-1.98)		
SM Signalman	*** -6.408 (-3.52)	*** -7.807 (-3.03)	* -3.113 (-1.94)	-2.024 (-1.01)	* -2.538 (-1.74)	** -4.270 (-2.19)	*** -5.118 (-5.13)	*** -4.321 (-3.25)		

TABLE 1

Explanations

***	Statistically significant at the 1% level
**	Statistically significant at the 5% level
*	Statistically significant at the 10% level
()	Figures in parentheses below coefficients are t values
c	Relative-compensation elasticity when Basic Pay (W_B) is used as a measure of military compensation
c'	Relative-compensation elasticity when military compensation is measured by Regular Military Compensation and bonuses (W_R)

(Radioman with an elasticity of -0.970 and Engineman with an elasticity of -0.639). This indicates that voluntary separations from the Navy ratings studied are sensitive (and in the great majority of cases are very sensitive) to changes in relative military-civilian compensation.

For Personnel Category I (enlisted personnel with less than 42 months of active service), the relative-compensation elasticities range from -2.515 for the Engineman rating to -9.859 for the Boatswain's Mate rating, when the relative compensation is based on military Basic Pay only (parameter c). When RMC and bonuses are included in military compensation (parameter c'), the elasticities range from -2.371 for the Operations Specialist rating to a maximum of -10.737 for Boatswain's Mate.

For Personnel Category II (enlisted personnel who completed between 42 and 48 months of active service), the relative compensation elasticities range from -1.908 (for the Aviation Antisubmarine Warfare Technician rating) to a maximum of -11.802 (for the Electronics Technician rating) when the relative compensation is based on military basic pay only (parameter c). When RMC and reenlistment bonuses are included in military compensation, the elasticities (c') range from -1.289 (for the Aviation Electronics Mate rating) to -4.854 (for the Boiler Technician rating).

For Personnel Category III (enlisted personnel who completed between 49 and 143 months of active service), the relative compensation elasticities range from -.639 (for the Engineman rating) to -6.640 (for the Hull Maintenance Technician rating) when the relative

compensation is based on military basic pay only (parameter c). When RMC and bonuses are included in military compensation, the elasticities (c') range from -.493 (for the Engineman rating) to -6.998 (for the Hospital Corpsman rating).

For Personnel Category IV (enlisted personnel who have completed no more than 143 months of active service), the relative compensation elasticities range from -1.909 (for the Operations Specialist rating) to -10.865 (for the Electronics Technician rating) when the relative compensation is based on military basic pay only. When RMC and bonuses are included in military compensation, the elasticities range from -1.339 (for the Operations Specialist rating) to -9.362 (for the Aviation Machinist's Mate rating).

Table 2 lists ratings by their relative-compensation elasticities for Personnel Categories I, II, and III when military compensation is measured by Basic Pay only. Only those elasticities based on statistically significant coefficients (10 per cent level or higher) are included. This represents 30 ratings of the 37 ratings in the case of Personnel Category I, 32 for Personnel Category II, and 33 for Personnel Category III.

An overall comparison of relative-compensation elasticities among the three personnel categories indicates that the responsiveness of quits to changes in the ratio of Basic Pay to earnings in a comparable civilian occupational classification is greatest for personnel in Category I (where the median elasticity is -5.641), followed by Category II (with a median elasticity of -3.688), and by Category III (where the median elasticity is -2.439).

TABLE 2
RANKING OF RELATIVE COMPENSATION ELASTICITIES*
BY PERSONNEL CATEGORY
(BASIC PAY MEASURE OF MILITARY COMPENSATION)

	Personnel Category I	Personnel Category II	Personnel Category III
1	BM (-9.859)	ET (-11.802)	HT (-6.640)
2	ET (-9.130)	IC (-10.563)	SK (-6.375)
3	AK (-8.895)	HM (-10.237)	FT (-6.090)
4	MR (-8.266)	AC (-9.252)	IC (-5.114)
5	AW (-8.174)	MR (-7.652)	BU (-4.507)
6	AD (-7.986)	FT (-7.561)	AK (-4.381)
7	AQ (-7.065)	GM (-6.617)	GM (-4.330)
8	HT (-6.737)	BT (-6.484)	AG (-4.159)
9	IC (-6.603)	DP (-6.442)	EM (-3.903)
10	AM (-6.466)	PR (-5.546)	BT (-3.645)
11	SM (-6.408)	AG (-5.329)	PR (-3.477)
12	MM (-6.089)	MM (-4.963)	EO (-2.794)
13	AO (-5.919)	BU (-4.546)	AG (-2.776)
14	FT (-5.841)	HT (-4.485)	ET (-2.632)
15	GM (-5.641)	DT (-3.738)	AE (-2.583)
16	EM (-5.458)	EO (-3.688)	SM (-2.538)
17	BT (-5.097)	RM (-3.582)	MR (-2.439)
18	AC (-4.768)	AE (-3.572)	AM (-2.391)
19	AT (-4.761)	QM (-3.557)	HM (-2.364)
20	PR (-4.298)	AD (-3.529)	PH (-2.203)
21	PN (-3.897)	AO (-3.347)	BM (-2.166)
22	PH (-3.743)	PH (-3.312)	DT (-2.049)
23	AB (-3.639)	AQ (-3.227)	AO (-2.004)
24	SH (-3.472)	BM (-3.181)	SH (-1.991)
25	AE (-3.326)	PN (-3.141)	AW (-1.891)
26	RM (-3.261)	EM (-3.133)	AD (-1.799)
27	QM (-3.188)	SM (-3.113)	PN (-1.704)
28	OS (-2.590)	SH (-3.042)	AT (-1.695)
29	DP (-2.552)	AM (-2.944)	OS (-1.683)
30	EN (-2.555)	OS (-2.691)	AB (-1.617)
31		AB (-2.245)	QM (-1.103)
32		AW (-1.908)	RM (-0.971)
33			EN (-0.639)

*Only elasticities statistically significant at the 10 per cent level or higher are listed.

(ii) Basic Pay vs. Regular Military Compensation:
A Comparison of Relative-Compensation Elasticities

The estimated elasticities shown in Table 1 provide a comparison of the responsiveness of quit rates to changes in the ratio of military compensation to earnings in an equivalent civilian occupation under two different measures of military compensation. The results of applying Regression Equation (1) where *Basic Pay* is used as a measure of military compensation are shown under column c. The c' column shows the elasticities estimated using Equation (2), in which military compensation for each rating in each of the personnel categories is measured by *Regular Military Compensation and reenlistment bonuses*.

An overall comparison of these two sets of elasticities shows that the elasticities are generally higher when Basic Pay is used as a measure of military compensation than is the case when Regular Military Compensation and bonuses are used (i.e. the values in the c columns compared to those in the c' columns).

Table 1 compares the two sets of elasticities by Personnel Category. For Personnel Categories II and III, there is a clear pattern. The c values are higher than the c' values in 100 per cent of the cases for Category II and in 8.8 per cent of the cases for Category III; i.e. the relative compensation elasticities are higher when changes in Basic Pay alone are used in the measurement of military compensation than when changes in RMC and reenlistment bonuses are included.

TABLE 3
BASIC PAY VS. REGULAR MILITARY COMPENSATION (RMC) AND BONUSES:
A COMPARISON OF RELATIVE-COMPENSATION ELASTICITIES*

	c Higher Than c'	
	No. of Cases	Percentage
Personnel Category I (Less than 42 months of service)	13	45.16
Personnel Category II (42-48 months of service)	32	100.00
Personnel Category III (49-143 months of service)	26	78.78

*Equivalent elasticities are included in the comparison only if at least one of the coefficients c or c' is statistically significant at the 10 per cent level or higher

c = Relative-Compensation Elasticity (Military Compensation Measured by Basic Pay)

c' = Relative-Compensation Elasticity (Military Compensation Measured by RMC and Bonuses)

This suggests that, in their quit-no quit decision, enlisted personnel in Categories II and III are more sensitive to changes in *Basic Pay* than they are to changes in *Regular Military Compensation and reenlistment bonuses*. However, further detailed investigation is required before any firm conclusions can be drawn.

The relative magnitude of the two computed elasticities is influenced by the behavior of components of military compensation over time. C will be *higher* than c' if during the relevant time period the percentage change in *Basic Pay* (the compensation measure used in calculating c) is *less* than the percentage change in all compensation other than Basic Pay; i.e. *reenlistment bonuses and Regular Military Compensation exclusive of Basic Pay*. This can be demonstrated as follows:

Between two consecutive quarters,

Let $\frac{\Delta Q}{Q} =$ % change in the quit rate,

$\frac{\Delta W_B}{W_B} =$ % change in Basic Pay,

$\frac{\Delta W_R}{W_R} =$ % change in RMC plus Reenlistment Bonuses,

$W_R = W_R - W_B =$ (RMC + Reenlistment Bonuses) - Basic Pay
 $=$ Basic Allowance for Quarters
 $+$ Basic Allowance for Subsistence
 $+$ Federal Income Tax Advantage
 $+$ Reenlistment Bonuses

or $W_R = W_B + W_O$

$$\text{Then, } c = \frac{\frac{\Delta Q}{Q}}{\frac{\Delta W_B}{W_B}}$$

$$\text{and } c' = \frac{\frac{\Delta Q}{Q}}{\frac{\Delta W_R}{W_R}}$$

And by substituting $W_B + W_O$ for W_R ,

$$c' = \frac{\frac{\Delta Q}{Q}}{\frac{\Delta(W_B + W_O)}{W_B + W_O}} = \frac{\frac{\Delta Q}{Q}}{\frac{\Delta W_B + \Delta W_O}{W_B + W_O}}$$

Now compare,

$$c = \frac{\frac{\Delta Q}{Q}}{\frac{\Delta W_B}{W_B}} \quad \text{with} \quad c' = \frac{\frac{\Delta Q}{Q}}{\frac{\Delta W_B + \Delta W_O}{W_B + W_O}}$$

Since the numerator $(\frac{\Delta Q}{Q})$ is the same in both c and c' , comparing

$\frac{\Delta W_B}{W_B}$ with $\frac{\Delta W_B + \Delta W_O}{W_B + W_O}$, shows that

$$\frac{\Delta W_B}{W_B} < \frac{\Delta W_B + \Delta W_O}{W_B + W_O}$$

$$\text{as } \frac{\Delta W_B}{W_B} \begin{matrix} < \\ > \end{matrix} \frac{\Delta W_O}{W_O}$$

$$\text{or } c \begin{matrix} > \\ < \end{matrix} c'$$

$$\text{as } \frac{\Delta W_B}{W_B} \begin{matrix} < \\ > \end{matrix} \frac{\Delta W_O}{W_O}$$

Hence, c (the relative compensation elasticity when military compensation is measured by Basic Pay only) is *greater than, equal to, or less than* c' (the relative compensation elasticity with military compensation measured by RMC and reenlistment bonuses) as the percentage change of mean *Basic Pay* in the rating is *less than, equal to, or greater than* that of *reenlistment bonuses, Basic Allowance for Quarters, Basic Allowance for Subsistence, and Federal Income Tax Advantage*.

As shown in Table 1, for Personnel in Category I (those with less than 42 months of active service), no clear pattern emerges between c and c' . Only in 45.16 per cent of the cases are the c coefficients higher than the c' coefficients. Category I personnel are predominantly first term enlistees. This removes reenlistment bonuses from the measure of military compensation used in calculating c' for this personnel category. The relationship between c and c' for Personnel Category I, therefore, is influenced by percentage changes in Basic Pay as compared to percentage changes in Basic Allowance for Quarters, Basic Allowance for Subsistence, and the Federal Income Tax Advantage as applicable on the average for the particular Navy rating.

TABLE 4

BUSINESS CYCLE - QUIT ELASTICITIES FOR NAVY RATINGS
BY PERSONNEL CATEGORY

Navy Rating	Personnel Category I		Personnel Category II		Personnel Category III		Personnel Category IV	
	b	b'	b	b'	b	b'	b	b'
AB Aviation Boatswain's Mate	^{**} -2.014 (-2.77)	^{**} -2.059 (-2.83)	^{**} 0.822 (2.36)	^{**} 1.262 (4.07)	0.179 (0.84)	^{**} 0.441 (2.39)	0.001 (0.00)	[*] 0.419 (1.74)
AC Aircontrolman	0.032 (0.06)	[*] -0.616 (-1.91)	-0.174 (-0.51)	^{**} 1.174 (3.88)	[*] 0.560 (1.75)	^{**} 0.984 (3.06)	0.012 (0.05)	^{**} 0.840 (4.87)
AD Aviation Machinist's Mate	^{**} -1.854 (-3.09)	[*] -1.053 (-1.98)	0.229 (0.74)	[*] 0.684 (2.05)	[*] 0.351 (1.90)	^{**} 0.399 (2.09)	^{**} -1.188 (-3.33)	-0.461 (-1.40)
AE Aviation Electrician's Mate	-0.398 (-0.67)	-0.052 (-0.11)	0.259 (0.88)	^{**} 0.813 (2.50)	[*] 0.485 (1.96)	^{**} 0.666 (2.75)	-0.864 (-1.91)	0.111 (0.29)
AG Aerographer's Mate	0.565 (1.11)	^{**} 0.774 (2.34)	[*] 0.742 (2.02)	^{**} 1.572 (8.85)	^{**} 0.942 (3.37)	^{**} 1.251 (4.49)	^{**} 0.525 (2.41)	^{**} 0.991 (9.42)
AK Aviation Storekeeper	0.424 (1.16)	[*] 1.106 (1.94)	-0.017 (-0.04)	-0.067 (-0.16)	[*] 0.589 (2.03)	0.522 (0.84)	-0.361 (-0.92)	-0.432 (-1.10)
AM Aviation Structural Mechanic	^{**} -1.374 (-2.26)	-0.738 (-1.45)	0.262 (0.81)	[*] 0.677 (2.03)	0.224 (0.95)	^{**} 0.588 (4.50)	-0.628 (-1.47)	-0.042 (-0.12)
A0 Aviation Ordnanceman	-0.524 (-1.46)	0.255 (0.92)	^{**} 0.889 (2.88)	^{**} 0.941 (2.50)	^{**} 1.049 (5.62)	^{**} 0.977 (5.17)	0.084 (0.32)	^{**} 0.588 (2.23)

Navy Rating	Personnel Category I		Personnel Category II		Personnel Category III		Personnel Category IV	
	b	b'	b	b'	b	b'	b	b'
AQ Aviation Firecontrol Technician	** -1.759 (-2.65)	* -1.124 (-2.08)	0.197 (0.35)	** 0.721 (2.26)	0.148 (0.40)	** 0.476 (2.56)	-0.201 (-0.64)	* 0.319 (1.77)
AT Aviation Electronics Technician	** -0.823 (-2.48)	-0.240 (-0.87)	0.772 (2.06)	** 1.055 (4.07)	** 0.497 (3.34)	** 0.803 (8.56)	0.041 (0.20)	** 0.452 (2.79)
AW Aviation Antisubmarine Warfare Technician	** -1.178 (-2.14)	-0.746 (-1.66)	0.599 (1.86)	** 0.925 (3.12)	0.280 (1.20)	** 0.628 (2.82)	0.109 (0.30)	** 0.571 (3.21)
BM Boatswain's Mate	** -1.616 (-2.17)	-0.418 (-0.80)	0.581 (1.20)	** 1.226 (4.37)	0.195 (1.26)	** 0.595 (5.25)	-0.453 (-1.21)	-0.887 (-1.34)
BT Boiler Technician	** -1.102 (-2.79)	* -0.682 (-2.00)	-0.221 (-0.44)	** 1.297 (7.56)	-0.036 (-0.09)	** 0.751 (4.47)	* -0.589 (-1.79)	0.283 (1.64)
BU Builder	0.292 (0.33)	0.118 (0.18)	0.398 (1.24)	** 1.358 (6.33)	-0.061 (-0.18)	** 0.544 (3.26)	-0.290 (-1.21)	0.274 (1.19)
DP Data Processing Technician	-0.116 (-0.37)	0.135 (0.59)	0.425 (1.41)	** 1.226 (3.55)	** 0.641 (3.28)	** 0.872 (5.86)	-0.214 (-0.80)	** 0.641 (3.03)
DS Data Systems Technician	0.386 (0.82)	0.551 (1.23)	-0.610 (-0.87)	-0.414 (-0.59)	** 0.954 (6.71)	** 0.900 (5.82)	** 0.650 (4.53)	** 0.701 (4.93)
DT Dental Technician	0.410 (0.57)	0.315 (0.49)	** 1.123 (4.16)	** 1.369 (4.88)	** 1.212 (3.61)	** 1.296 (4.10)	** 0.725 (3.37)	** 0.921 (3.43)

Navy Rating	Personnel Category I		Personnel Category II		Personnel Category III		Personnel Category IV	
	b	b'	b	b'	b	b'	b	b'
EM Electrician's Mate	*** -1.482 (-4.63)	*** -0.972 (-3.46)	0.256 (0.65)	*** 0.945 (3.47)	-0.513 (-1.12)	-0.368 (-1.23)	** -0.430 (-2.44)	* -0.524 (1.98)
EN Engineman	** -2.125 (-2.78)	** -2.139 (-2.85)	0.995 (2.50)	0.049 (0.13)	** 0.459 (2.78)	*** 0.562 (3.48)	0.109 (0.30)	0.427 (1.35)
EO Equipment Operator	0.345 (0.67)	0.497 (1.13)	** 0.765 (2.39)	*** 1.464 (6.63)	0.301 (1.44)	*** 0.712 (4.26)	** 0.612 (2.13)	*** 0.846 (3.40)
ET Electronics Technician	*** -1.430 (-3.59)	-0.229 (-0.71)	-0.558 (-1.01)	* -1.119 (-1.95)	0.276 (1.48)	0.382 (1.71)	*** -1.132 (-3.89)	*** 0.575 (2.57)
FT Fire Control Technician	-0.614 (-0.96)	0.123 (0.29)	-0.305 (-1.00)	*** 1.234 (3.92)	0.527 (1.42)	** 1.182 (2.39)	-0.221 (-0.52)	*** 0.908 (5.21)
GM Gunner's Mate	0.021 (0.05)	-0.914 (-1.53)	*** 0.802 (3.11)	-0.418 (-0.95)	*** 0.578 (4.19)	*** 0.812 (3.73)	** 0.534 (2.73)	*** -0.586 (-1.61)
HM Hospital Corpsman	-0.665 (-0.85)	0.170 (0.36)	-0.592 (-0.82)	*** 1.256 (3.50)	0.308 (0.92)	0.254 (0.99)	-0.483 (-1.43)	*** 0.632 (2.93)
HT Hull Maintenance Technician	*** -1.385 (-3.09)	** -1.363 (-2.25)	0.391 (1.08)	** 0.977 (2.61)	** -0.603 (-2.32)	* 0.420 (1.95)	*** -0.858 (-4.44)	** -0.832 (-2.29)
IC Interior Communications Electrician	-0.775 (-1.64)	-0.659 (-1.17)	-0.387 (-0.81)	*** 1.202 (4.79)	0.090 (0.37)	*** 0.737 (7.40)	-0.430 (-1.22)	*** 0.503 (3.17)
MM Machinist's Mate	* -1.416 (-1.70)	* -1.492 (-1.83)	*** 1.393 (5.16)	-0.254 (-0.34)	* 0.718 (1.98)	* 0.705 (2.01)	*** 0.830 (4.22)	** 1.014 (2.32)

Personnel Category I Personnel Category II Personnel Category III Personnel Category IV

Navy Rating	b	b'	b	b'	b	b'	b	b'
MR Machinery Repairman	-1.319 (-2.59)	-0.276 (-0.77)	-0.025 (-0.06)	-0.685 (-1.00)	0.328 (1.92)	0.563 (3.19)	-0.692 (-2.48)	0.426 (1.76)
OS Operations Specialist	-0.338 (-0.98)	0.028 (0.10)	0.104 (0.26)	0.693 (2.53)	0.693 (4.59)	1.009 (8.40)	0.299 (1.78)	0.633 (4.53)
PH Photographer	-0.790 (-1.88)	-0.285 (-0.81)	0.399 (0.84)	1.128 (4.58)	0.372 (1.61)	0.793 (4.28)	-0.032 (-0.11)	0.491 (2.19)
PN Personnelman	-1.863 (-2.21)	-1.861 (-2.26)	0.492 (1.36)	1.169 (4.50)	0.377 (2.78)	0.691 (6.17)	-0.253 (-0.76)	0.309 (1.14)
PR Aircrew Survival Equipmentman	-0.048 (-0.17)	0.453 (1.79)	0.935 (3.65)	1.543 (5.47)	0.712 (8.25)	1.097 (6.61)	0.529 (3.01)	1.030 (4.50)
QM Quartermaster	-0.548 (-1.43)	-0.151 (-0.47)	0.299 (0.74)	1.124 (3.67)	0.440 (2.90)	0.629 (5.62)	-0.049 (-0.20)	0.350 (1.72)
RM Radioman	-1.396 (-2.54)	-1.408 (-2.61)	0.523 (1.97)	1.257 (5.44)	0.482 (2.30)	0.618 (2.90)	0.077 (0.35)	0.573 (2.97)
SH Ship's Serviceman	-0.512 (-1.52)	-0.176 (-0.62)	0.233 (0.67)	0.959 (3.90)	0.453 (2.21)	0.895 (6.29)	-0.141 (-0.74)	0.314 (1.77)
SK Storekeeper	-1.547 (-1.29)	-0.163 (-0.16)	0.379 (0.45)	0.124 (0.32)	0.149 (0.32)	0.795 (1.76)	-0.848 (-1.10)	0.806 (2.59)
SM Signalman	-1.346 (-2.32)	-0.841 (-1.63)	0.482 (1.05)	1.337 (5.54)	0.218 (0.60)	0.850 (3.43)	-0.597 (-2.08)	0.273 (1.26)

TABLE 4

Explanations

***	Statistically significant at the 1% level
**	Statistically significant at the 5% level
*	Statistically significant at the 10% level
()	Figures in parentheses below coefficients are t values
b	Business cycle - quit elasticity when Basic Pay (W_B) is used as a measure of military compensation
b'	Business cycle - quit elasticity when military compensation is measured by Regular Military Compensation and bonuses (W_R)

The upshot is that the differential effect of given increases in military compensation either in the form of *Basic Pay* or *Reenlistment Bonuses* as well as components of RMC other than *Basic Pay* is a complex issue. Definite conclusions can be drawn only following a detailed investigation of the differential impact on the quit rate of individual components of military compensation.

(iii) Business Cycle Quit Elasticities

Coefficients b and b' in Equations (1) and (2) respectively measure the response of the quit rate in a Navy rating to fluctuations in general economic conditions (as measured by changes in the quit rate for all manufacturing).

Table 4 lists these business cycle elasticities by personnel category for each of the 37 Navy ratings. The significance of these computed elasticities can be illustrated using the Aviation Ordnanceman rating. The business-cycle - quit elasticity for Category II personnel (those with 42-48 months of service) in this rating is given in Table 4 as 0.889 per cent when military compensation is measured by Basic Pay only (Column B). This indicates that the quit rate for this personnel group increases by 0.889 per cent for each 1 per cent increase in the all manufacturing quit rate, assuming no change in their relative military-civilian compensation. The equivalent increase for Personnel Category III (those with 49-143 months of service) in the same Aviation Ordnanceman rating is 1.049 per cent.

As explained in Chapter I above,² this effect of changes in general economic conditions on quit rates in a Navy rating is in addition to the effect of changes in the relative military-civilian compensation rate. In the regression equations, each of the two effects is measured separately by holding the other constant.

Table 5 lists ratings by their business cycle-quit elasticities for Personnel Categories I, II, and III when military compensation is measured by Basic Pay. Only those elasticities based on statistically significant coefficients (10 per cent level or higher) are included. This represents 17 of the 37 ratings in the case of Personnel Category I, 12 for Personnel Category II, and 21 for Personnel Category III.

A comparison of the elasticities among the three personnel categories shows that the responsiveness of quits in Navy ratings to changes in general economic conditions (as represented by the quit rate in manufacturing) is greatest for Personnel Category I (where the median elasticity is -1.430), followed by Category II (with a median elasticity of 0.842) and by Category III (where the median elasticity is 0.578).

For Personnel Categories II and III, all but one of the business cycle quit elasticities which are statistically significant have a positive sign.³ The positive signs of business cycle-quit elasticities for

²See Section A (ii), Chapter I for discussion of the relationship between general economic conditions and the quit rate in a Navy rating.

³See Table 4. Out of a total of 93 business cycle quit elasticities in Personnel Categories II and III, only b' for the Electronics Technician rating in Personnel Category II has a negative sign, with a statistical significance of 10 per cent.

TABLE 5
RANKING OF BUSINESS CYCLE-QUIT ELASTICITIES*
BY PERSONNEL CATEGORY
(BASIC PAY MEASURE OF MILITARY COMPENSATION)

	Personnel Category I	Personnel Category II	Personnel Category III
1	EN (-2.125)	MM (1.393)	DT (1.212)
2	AB (-2.014)	DT (1.123)	AO (1.049)
3	PN (-1.863)	EN (0.995)	DS (0.954)
4	AD (-1.854)	PR (0.935)	AG (0.942)
5	AQ (-1.759)	AO (0.889)	MM (0.718)
6	BM (-1.616)	AB (0.882)	PR (0.712)
7	EM (-1.482)	GM (0.802)	OS (0.693)
8	ET (-1.430)	AT (0.772)	DP (0.641)
9	RM (-1.396)	EO (0.765)	HT (0.603)
10	HT (-1.385)	AG (0.742)	AK (0.589)
11	AW (-1.378)	AW (0.599)	GM (0.578)
12	AM (-1.374)	RM (0.523)	AC (0.560)
13	SM (-1.346)		AT (0.497)
14	MR (-1.319)		AE (0.485)
15	BT (-1.102)		RM (0.482)
16	AT (-0.823)		EN (0.459)
17	PH (-0.790)		SH (0.453)
18			QM (0.440)
19			PN (0.377)
20			AD (0.351)
21			MR (0.328)

*Only those elasticities that are statistically significant at the 10 per cent level or higher are listed.

Navy personnel in Categories II and III indicate that an upturn (down-turn) in the level of general economic conditions, as measured by a rise (decline) in the manufacturing quit rate, results in a rise (decline) in the quit rate of those Navy personnel.

For Personnel Category I, the business-cycle - quit elasticities are only positive in three cases, all of which are in the b' measure, i.e. where military compensation comprises RMC and reenlistment bonuses. In the majority of cases, the elasticities are either not statistically significant (at 10 per cent level or higher), or have a negative sign - in 16 cases under the b measure (where only Basic Pay is included in military compensation) and in 10 cases under the b' measure.

This suggests that for personnel with less than 42 months of service, the quit rate is either unrelated to general economic conditions or the relationship is opposite of that found for personnel in Categories II and III (those with 42-143 months of service).

Personnel in Category I are predominantly in their first term of service. During periods of an upswing (downswing) in general economic activity, with an increase (decrease) in employment opportunities in the private sector, the supply of personnel for a Navy rating declines (rises) for any given relative military-civilian compensation.

The decline (rise) in potential recruitment for a rating may coincide with tightening (easing) on releasing enlistees under certain separation codes of particular relevance to first term personnel.⁴ Thus

⁴ see Table A-1 (Appendix A) for list of separation codes included in the measurement of the quit rate.

while an upswing (downswing) in the business cycle increases (decreases) the incentive for enlisted personnel to separate from the Navy as employment opportunities increase (decline) in the private sector, it could coincide with an environmental change within the Navy that results in more difficult (easier) separation.

On this interpretation, the insignificant statistical relationship between general economic conditions and the quit rates for personnel in Category I in some of the ratings is the result of these two opposing effects cancelling each other--the business cycle effects are virtually eliminated. For other ratings, the possible tightening (loosening) on releasing personnel coincident with the decrease (increase) in the supply of new recruits may lead to overcompensation for the effects of the business cycle--hence the negative business-cycle - quit elasticities for Personnel Category I in those ratings.

*(iv) Basic Pay vs. Regular Military Compensation and Bonuses:
A Comparison of Business Cycle - Quit Elasticities*

A comparison of business-cycle elasticities under the two measures of military compensation is shown in Table 6.

For personnel in Categories II and III, business-cycle - quit elasticities are generally higher when military compensation is measured by RMC and bonuses (b') than when only Basic Pay is used (b). This is so in 90.91 per cent of the time for Personnel Category II and 82.86 per cent of the time for Personnel Category III.

TABLE 6

BASIC PAY VS. REGULAR MILITARY COMPENSATION (RMC) AND BONUSES:
A COMPARISON OF BUSINESS CYCLE-QUIT ELASTICITIES*

	b' Higher Than b	
	No. of Cases	Percentage
Personnel Category I (Less than 42 months of service)	8	36.36
Personnel Category II (42-48 months of service)	30	90.91
Personnel Category III (49-143 months of service)	29	82.86

*Equivalent elasticities are included in the comparison only if at least one of the coefficients b or b' is statistically significant at the 10 per cent level or higher.

b = Business Cycle-Quit Elasticity (Military Compensation Measured by Basic Pay)

b' = Business Cycle-Quit Elasticity (Military Compensation Measured by RMC and Bonuses)

8 This suggests that for Personnel in Categories II and III, the quit rate due to general economic conditions tends to be lower if a given military compensation increase is in *Basic Pay* than if it is in the form of *Regular Military Compensation and reenlistment bonuses*.

8 The differential effect (on the sensitiveness of the quit rate to cyclical fluctuations in the economy) of these two forms of military compensation may be explained in terms of their relative evaluation by enlisted personnel. Reenlistment bonuses may be seen as a "one-shot" increase in compensation over the period of reenlistment and increases in Basic Pay as an increase in the present value of compensation over the entire service horizon. However, definite conclusions can be drawn only after detailed investigation of the differential impact of individual components of military compensation on the quit rate, as indicated above in the discussion of the comparison of relative-compensation elasticities.

8 For Personnel in Category I (in contrast with those in Categories II and III), the business-cycle - quit elasticities are generally lower when military compensation is measured by RMC than when only Basic Pay is used, i.e. b' is lower than b in 64.64 per cent of the cases.

CONCLUSIONS

The major finding of the study is the sensitivity of voluntary separation to changes in military compensation in Navy ratings relative to earnings in equivalent civilian occupations. The specific measures of this responsiveness (i.e. relative-compensation elasticities) for enlisted personnel with different lengths of service in each of the 37 ratings indicate the extent to which voluntary separations could be decreased through increases in military compensation compared to earnings in equivalent civilian occupational categories.

The study also provided measures of the effect on voluntary separation from Navy ratings of fluctuations in general economic activity, i.e. business-cycle - quit elasticities.

The measurement of business-cycle effects separately from the effects of changes in relative military-civilian compensation allows for flexibility of policies for dealing with these two specific sources of voluntary separation from service in Navy ratings.

The use of two different measures of military compensation (Basic Pay vs. Regular Military Compensation and reenlistment bonuses) produced consistent results with regard to the relationship between voluntary separation and military-civilian compensation on the one hand and voluntary separation and business cycle fluctuations on the other. Differences in obtained magnitudes suggest patterns of differential effects of these two forms of military compensation on the rate of voluntary separation. However, the complexities of the relationships involved caution against any

definite conclusions in this regard pending further investigation particularly of the separate effects of individual components of military compensation.

APPENDIX A

APPENDIX A

Table A-1	List of Separation Codes Included in Quits
Table A-2	Navy Ratings and Equivalent Standard Industrial Classifications
Table A-3	Analysis of Regression Equations

TABLE A-1

LIST OF SEPARATION CODES INCLUDED IN QUILTS*

(0: RELEASE FROM ACTIVE SERVICE)

- 01 Expiration of Term of Service
- 02 Early Release - Insufficient Retainability
- 03 Early Release - To Attend School
- 04 Early Release - Police Duty
- 05 Early Release - In the National Interest
- 06 Early Release - Seasonal Employment
- 07 Early Release - To Teach
- 08 Early Release - Other

(1: MEDICAL DISQUALIFICATIONS)

- 10 Conditions Existing Prior to Service
- 12 Permanent Disability - Retired
- 13 Temporary Disability - Retired
- 16 Unqualified for Active Duty - Other

(2: DEPENDENCY OR HARDSHIP)

- 22 Dependency or Hardship

(5: RETIREMENT (OTHER THAN MEDICAL))

- 50 Retirement (Other than Medical) - 20-30 Years of Service
- 51 Retirement (Other than Medical) - Over 30 Years of Service

TABLE A-1
Continued

(6: FAILURE TO MEET MINIMUM BEHAVIORAL OR PERFORMANCE CRITERIA)

60 Character or Behavior Disorder

61 Motivational Problems

75 AWOL, Desertion

82 Unsuitability (Reason Unknown)

84 Basic Training Attrition

86 Expeditions Discharge

(9: OTHER SEPARATIONS OR DISCHARGES)

92 Sole Surviving Son

93 Marriage

94 Pregnancy

96 Conscientious Objector

97 Parenthood

98 Breach of Contract

99 Other

*Interservice Separation Codes: Enlisted - M&L B-2, 20 July 1977

TABLE A-2
NAVY RATINGS AND EQUIVALENT
STANDARD INDUSTRIAL CLASSIFICATIONS

Navy Rating	SIC (Standard Industrial Classification)	
	Code	Description
AB Aviation Boatswain's Mate	16	Contract Construction: Heavy Construction
AC Aircontrolman	38	Manufacturing: Instruments and Related Products
AD Aviation Machinist's Mate	372	Manufacturing: Transportation Equipment - Aircraft and Parts
AE Aviation Electrician's Mate	372	Manufacturing: Transportation Equipment - Aircraft and Parts
AG Aerographer's Mate	36	Manufacturing: Electrical Equipment and Supplies
AK Aviation Storekeeper	52-59	Wholesale and Retail Trade: Retail Trade (Building Materials and Farm Equipment, Retail General Merchandise, Food Stores, Automotive Dealers and Service Stations, Apparel and Accessory Stores, Furniture and Home Furnishing Stores, Eating and Drinking Places)
AM Aviation Structural Mechanic	372	Manufacturing: Transportation Equipment - Aircraft and Parts
AD Aviation Ordnanceman	365	Manufacturing: Electrical Equipment and Supplies - Radio and TV Receiving Equipment
AQ Aviation Firecontrol Technician	173	Contract Construction: Special Trade Contractors - Electrical Work

Navy Rating	SIC (Standard Industrial Classification)	
	Code	Description
AT Aviation Electronics Technician	3694	Manufacturing: Electrical Equipment and Supplies - Engine Electrical Equipment
AW Aviation Antisubmarine Warfare Technician	366	Manufacturing: Electrical Equipment and Supplies - Communication Equipment
BM Boatswain's Mate	42	Transportation and Public Utilities: Trucking and Warehousing
BT Boiler Technician	49	Transportation and Public Utilities: Electrical, Gas and Sanitary Services
BU Builder	7	Contract Construction: Special Trade Contractors
DP Data Processing Technician	3573	Manufacturing: Machinery Except Electrical - Electronic Computing Equipment
DS Data Systems Technician	361	Manufacturing: Electrical Equipment and Supplies - Electrical Test and Distributing Equipment
DT Dental Technician	806	Services: Medical and Other Health Services - Hospitals
EM Electrician's Mate	478	Contract Construction: Special Trade - Electrical Work
EN Engineman	371	Manufacturing: Transport Equipment - Motor Vehicles and Equipment
EO Equipment Operator	6	Contract Construction: Heavy Construction
ET Electronics Technician	3694	Manufacturing: Electrical Equipment and Supplies - Engine Electrical Equipment
FT Fire Control Technician	3694	Manufacturing: Electrical Equipment and Supplies - Engine Electrical Equipment

Navy Rating	SIC (Standard Industrial Classification)	
	Code	Description
GM Gunner's Mate	3694	Manufacturing: Electrical Equipment and Supplies - Engine Electrical Equipment
HM Hospital Corpsman	806	Services: Medical and Other Health Services - Hospitals
HT Hull Maintenance Technician	171	Contract Construction: Special Trade - Plumbing, Heating, Air Conditioning
IC Interior Communications Electrician	3694	Manufacturing: Electrical Equipment and Supplies - Engine Electrical Equipment
MM Machinist's Mate	171	Contract Construction: Special Trade - Plumbing, Heating, Air Conditioning
MR Machinery Repairman	354	Manufacturing: Machinery, Except Electrical - Metal Working Machinery
OS Operations Specialist	38	Manufacturing: Instruments and Related Products
PH Photographer	38	Manufacturing: Instruments and Related Products
PN Personnelman		Finance, Insurance, and Real Estate
PR Aircrew Survival Equipmentman		Manufacturing
QM Quartermaster	42	Transportation and Public Utilities: Trucking and Warehousing
RM Radioman	38	Manufacturing: Instruments and Related Products

Navy Rating	SIC (Standard Industrial Classification)	
	Code	Description
SH Ship's Serviceman	52-59	Wholesale and Retail Trade: Retail Trade (Building Materials and Farm Equipment, Retail General Merchandise, Food Stores, Automotive Dealers and Service Stations, Apparel and Accessory Stores, Furniture and Home Furnishing Stores, Eating and Drinking Places)
SK Storekeeper	50	Wholesale and Retail Trade: Wholesale Trade
SM Signalman	42	Transportation and Public Utilities: Trucking and Warehousing

TABLE A -3
ANALYSIS OF REGRESSION EQUATIONS

For each of the 37 Navy ratings included in the study, the results of the regression analysis are shown by Personnel Category I, II, III, and IV. For each Personnel Category, the first row shows the results when military compensation for the rating was measured by Basic Pay (W_B) only. The second row shows the results when Regular Military Pay (RMC) and bonuses (W_R) are included.

Explanations

***	Statistically significant at the 1% level
**	Statistically significant at the 5% level
*	Statistically significant at the 10% level
()	Figures in parentheses below coefficients are t values
$\frac{2}{R}$	R^2 corrected for degrees of freedom
$\frac{2}{R}$	below 0.200
S.E.E.	Standard error of estimate
D-W	Durbin-Watson statistic
p	p value

Navy Rating	Personnel Category	(ln a) Constant Term	(b) Q_m	(c) W_R/W_P	(c') W_R/W_P	$\frac{2}{R}$ S.E.E.	D-W ρ
AB Aviation Boatswain's Mate	I	0.000 (0.00)	** -2.014 (-2.77)	*** -3.639 (-3.42)		0.764 0.31	1.798 1.00
		0.000 (0.00)	** -2.059 (-2.83)		** -3.532 (-3.36)	0.760 0.31	1.817 1.00
	II	0.371 (0.45)	** 0.822 (2.36)	** -2.245 (-2.20)		<u>0.30</u>	2.909 0.40
		0.521 (0.57)	*** 1.262 (4.07)		-0.922 (-0.78)	<u>0.33</u>	2.412 0.40
	III	0.555 (1.02)	0.179 (0.84)	** -1.617 (-2.47)		0.220 0.20	1.949 0.40
		0.535 (0.90)	** 0.441 (2.39)		** -1.736 (-2.31)	<u>0.20</u>	2.000 0.40
	IV	0.762 (1.22)	0.001 (0.00)	*** -2.923 (-4.12)		0.226 0.23	2.005 0.40
		0.719 (1.03)	* 0.419 (1.74)		** -2.937 (-3.20)	<u>0.25</u>	1.868 0.40

Navy Rating	Personnel Category	(ln a) Constant Term	(b) Q_m	(c) W_B/W_P	(c') W_R/W_P	$\frac{2}{R}$ S.E.E.	D-W ρ
AC	Aircontrolman						
	I	-0.498 (-0.80)	0.032 (0.06)	-4.768* (-1.79)		0.34	2.071 0.60
		-0.571 (-1.05)	-0.616* (-1.91)		-5.568 (-1.24)	0.36	2.069 0.70
	II	0.388 (1.20)	-0.174 (-0.31)	-9.252** (-2.60)		0.28	1.746 0.90
		0.346 (0.88)	1.174*** (3.88)		-0.579 (-0.29)	0.33	2.008 0.90
	III	-0.179 (-0.30)	0.560* (1.75)	-3.596 (-1.43)		0.570	1.827 0.50
		-0.525 (-0.65)	0.984*** (3.06)		-0.078 (-0.05)	0.479 0.30	1.324 0.40
	IV	0.135 (0.79)	0.012 (0.05)	-5.886*** (-3.89)		0.15	1.670 0.90
		0.156 (0.71)	0.840*** (4.87)		-1.134 (-0.59)	0.19	1.641 0.90

Navy Rating	Personnel Category	(ln a) Constant Term	(b) Q_m	(c) W_B/W_P	(c') W_R/W_P	$\frac{2}{R}$ S.E.E.	D-W ρ
AD Aviation Machinist's Mate	I	-0.151 (-0.47)	*** -1.854 (-3.09)	*** -7.986 (-4.19)		0.607 0.28	1.607 0.90
		-0.214 (-0.59)	* -1.053 (-1.98)		*** -9.311 (-3.26)	0.511 0.32	1.546 0.90
	II	1.329 (1.60)	0.229 (0.74)	*** -3.529 (-4.15)		0.24	1.958 0.30
		1.727 (1.73)	* 0.684 (2.05)		** -2.688 (-2.40)	0.29	1.924 0.30
	III	-0.117 (-0.16)	* 0.351 (1.90)	*** -1.799 (-3.65)		0.400 0.14	2.009 0.10
		0.509 (0.84)	* 0.399 (2.09)		*** -1.873 (-3.34)	0.509 0.84	2.074 0.20
	IV	0.190 (0.93)	*** -1.188 (-3.33)	*** -7.446 (-5.69)		0.431 0.18	1.871 0.90
		0.240 (0.98)	-0.461 (-1.40)		*** -9.362 (-4.08)	0.22	1.567 0.90

Navy Rating	Personnel Category	(ln a) Constant Term	(b) Q_m	(c) W_B/W_P	(c') W_R/W_P	$\frac{2}{R}$ S.E.E.	D-W ρ
AE Aviation Electrician's Mate	I	0.225 (0.35)	-0.398 (-0.67)	-3.326 [*] (-1.76)		0.35	2.029 0.60
		0.107 (0.16)	-0.052 (-0.11)		-4.029 (-1.54)	0.36	1.972 0.60
	II	1.240 (1.55)	0.259 (0.88)	-3.572 ^{**} (-4.35)		0.23	2.028 0.30
		1.819 [*] (1.84)	0.813 ^{**} (2.50)		-1.289 ^{**} (-2.37)	0.29	2.051 0.30
	III	-0.781 (-0.91)	0.485 [*] (1.96)	-2.583 ^{**} (-3.59)		0.487 0.19	2.058 0.20
		-0.007 (-0.01)	0.666 ^{**} (2.75)		-1.729 ^{**} (-3.91)	0.524 0.18	2.092 0.20
	IV	0.299 (1.11)	-0.864 [*] (-1.91)	-6.313 ^{**} (-3.70)		0.383 0.24	1.942 0.90
		0.463 (1.38)	0.111 (0.29)		-4.415 [*] (-1.84)	0.29	1.934 0.90

Navy Rating	Personnel Category	(ln a) Constant Term	(b) Q_m	(c) W_B/W_P	(c') W_R/W_P	$\frac{2}{R}$ S.E.E.	D-W ρ
AG Aerographer's Mate							
	I	-0.273 (-0.65)	0.565 (1.11)	-1.117 (-0.48)		0.471 0.28	1.049 0.90
		-0.281 (-0.87)	** 0.774 (2.34)		-0.042 (-0.01)	0.464 0.28	0.985 0.90
	II	0.169 (0.42)	* 0.742 (2.02)	** -5.339 (-2.41)		<u>0.26</u>	2.046 0.70
		0.056 (0.12)	*** 1.572 (8.85)		-1.235 (-0.79)	<u>0.29</u>	1.933 0.70
	III	-1.897 (-1.94)	** 0.942 (3.37)	** -4.159 (-4.60)		0.530 0.25	2.749 0.00
		-0.707 (-0.90)	*** 1.251 (4.49)		*** -3.916 (-5.35)	0.606 0.23	3.086 0.00
	IV	0.029 (0.12)	** 0.525 (2.41)	** -3.011 (-2.43)		<u>0.15</u>	2.123 0.70
		-0.055 (-0.20)	*** 0.991 (9.42)		-1.169 (-0.81)	<u>0.17</u>	1.999 0.70

Navy Rating	Personnel Category	(ln a) Constant Term	(b) Q_m	(c) W_B/W_P	(c') W_R/W_P	$\frac{2}{R}$ S.E.E.	D-W ϕ
AK Aviation Storekeeper	I	0.238 (0.51)	0.424 (1.16)	^{**} -8.895 (-2.54)		<u>0.41</u>	1.998 0.90
		0.191 (0.37)	[*] 1.106 (1.94)		-4.749 (-1.26)	<u>0.46</u>	1.936 0.90
	II	0.000 (0.00)	-0.017 (-0.04)	-3.128 (-1.60)		<u>0.18</u>	2.065 1.00
		0.000 (0.00)	-0.067 (-0.16)		-2.446 (-1.37)	<u>0.19</u>	2.147 1.00
	III	1.063 (1.16)	[*] 0.589 (2.03)	[*] -4.381 (-2.14)		<u>0.22</u>	1.845 0.20
		0.000 (0.00)	0.522 (0.84)		-3.285 (-1.46)	<u>0.27</u>	2.584 1.000
	IV	0.000 (0.00)	-0.361 (-0.92)	^{**} -5.961 (-4.38)		0.381 0.17	2.194 1.00
		0.000 (0.00)	-0.432 (-1.10)		^{**} -5.487 (-4.24)	0.361 0.17	2.271 1.00

Navy Rating	Personnel Category	(ln a) Constant Term	(b) Q_m	(c) W_B/W_P	(c') W_R/W_P	$\frac{2}{R}$ S.E.E.	D-W ρ
AM	Aviation Structural Mechanics	I	^{**} -1.347 (-2.26)	^{***} -6.646 (-3.52)		0.581 0.29	1.637 0.90
			-0.211 (-0.59)		^{***} -8.188 (-2.97)	0.526 0.31	1.531 0.90
		II	[*] 1.602 (1.85)	^{***} -2.944 (-3.34)		<u>0.25</u>	1.948 0.30
			[*] 2.023 (2.02)		[*] -1.622 (-1.83)	<u>0.29</u>	1.867 0.30
	III		-0.048 (-0.16)	^{**} -2.391 (-2.37)		0.543 0.17	1.940 0.60
			-0.067 (-0.21)		[*] -2.179 (-1.99)	0.507 0.17	1.956 0.60
		IV	0.123 (0.49)	^{***} -5.429 (-3.49)		<u>0.22</u>	2.157 0.90
			0.127 (0.46)		^{**} -6.376 (-2.65)	<u>0.24</u>	1.802 0.90

Navy Rating	Personnel Category	(ln a) Constant Term	(b) Q_m	(c) W_B/W_P	(c') W_R/W_P	$\frac{2}{R}$ S.E.E.	D-W ρ
AO Aviation Ordnanceman	I	0.051 (0.17)	-0.524 (-1.46)	-5.919 ^{***} (-3.40)		0.544 0.26	1.828 0.90
		0.019 (0.05)	0.255 (0.92)		-5.066 ^{**} (-2.12)	0.400 0.30	1.645 0.90
		0.780 (0.95)	0.889 ^{***} (2.88)	-3.347 ^{**} (-2.47)		0.30	2.025 0.40
	II	1.753 (1.54)	0.941 ^{**} (2.50)		-0.549 (-0.65)	0.30	1.977 0.30
		-1.448 ^{**} (-2.31)	1.049 ^{***} (5.62)	-2.004 ^{***} (-3.24)		0.603 0.16	2.335 0.00
		-0.500 (-0.90)	0.977 ^{***} (5.17)		-1.214 ^{**} (-2.81)	0.564 0.17	2.319 0.00
	IV	0.465 (1.38)	0.084 (0.32)	-5.226 ^{***} (-3.16)		0.295 0.25	2.008 0.80
		0.361 (1.03)	0.588 ^{**} (2.23)		-3.741 [*] (-1.79)	0.30	2.130 0.90

Navy Rating	Personnel Category	(ln a) Constant Term	(b) Q_m	(c) W_B/W_P	(c') W_R/W_P	$\frac{2}{R}$ S.E.E.	D-W p
AQ Aviation Firecontrol Technician	I	-0.195 (-0.47)	-1.759 ^{**} (-2.65)	-7.065 ^{**} (-4.07)		0.358 0.36	1.912 0.90
		-0.261 (-0.62)	-1.124 [*] (-2.08)		-8.357 ^{**} (-4.00)	0.347 0.37	1.899 0.90
	II	0.130 (0.22)	0.197 (0.35)	-3.227 [*] (-1.98)		0.32	1.915 0.60
		1.005 (1.12)	0.721 ^{**} (2.26)		-1.458 ^{**} (-2.10)	0.33	1.920 0.40
	III	-0.020 (-0.07)	0.148 (0.40)	-2.776 ^{**} (-2.16)		0.807 0.21	1.826 0.80
		0.137 (0.41)	0.476 ^{**} (2.56)		-3.127 ^{**} (-3.11)	0.808 0.21	2.005 0.70
	IV	0.029 (0.11)	-0.201 (-0.64)	-3.559 ^{**} (-3.60)		0.541 0.18	1.933 0.70
		0.343 (0.88)	0.319 [*] (1.77)		-2.973 ^{**} (-3.88)	0.543 0.18	2.039 0.50

Navy Rating	Personnel Category	(1n a) Constant Term	(b) Q_m	(c) W_B/W_P	(c') W_R/W_P	$\frac{2}{R}$ S.E.E.	D-W ρ
AT Aviation Electronics Technician	I	0.144 (0.54)	^{**} -0.823 (-2.48)	^{***} -4.761 (-4.90)		0.538 0.23	1.553 0.90
		0.112 (0.39)	-0.240 (-0.87)		^{***} -5.007 (-4.21)	0.457 0.25	1.541 0.90
		0.755 (1.00)	[*] 0.772 (2.06)	-1.339 (-1.16)		<u>0.34</u>	1.972 0.50
	II	0.715 (0.95)	^{***} 1.055 (4.07)		-1.039 (-1.05)	<u>0.34</u>	2.013 0.50
		-0.018 (-0.08)	^{***} 0.497 (3.34)	^{**} -1.695 (-2.76)		0.767 0.14	1.552 0.70
		-0.043 (-0.18)	^{***} 0.803 (8.56)		[*] -1.241 (-1.99)	0.728 0.16	1.488 0.70
	IV	0.176 (1.00)	0.041 (0.20)	^{***} -2.630 (-3.94)		0.593 0.15	2.083 0.90
		0.226 (1.14)	^{***} 0.452 (2.79)		^{***} -2.326 (-3.06)	0.502 0.17	1.915 0.90

Navy Rating	Personnel Category	(ln a) Constant Term	(b) Q_m	(c) W_B/W_P	(c') W_R/W_P	$\frac{2}{R}$ S.E.E.	D-W ρ
AW	Aviation Antisubmarine Technician	-0.227 (-0.56)	^{**} -1.378 (-2.14)	^{**} -8.174 (-3.39)		0.266 0.35	1.858 0.90
		-0.348 (-0.89)	-0.746 (-1.66)		^{***} -11.923 (-3.80)	0.332 0.34	1.886 0.90
	II	1.520 [*] (1.76)	0.599 [*] (1.86)	-1.908 [*] (-1.96)		0.25	1.086 0.30
		1.625 [*] (1.80)	0.925 ^{**} (3.12)		-0.878 (-1.41)	0.26	1.053 0.30
	III	0.483 (0.83)	0.280 (1.20)	-1.891 ^{**} (-2.17)		0.487 0.21	1.922 0.40
		0.436 (0.65)	0.628 ^{**} (2.82)		^{***} -1.641 (-3.07)	0.547 0.20	1.977 0.30
	IV	0.351 (1.15)	0.109 (0.30)	-2.994 [*] (-1.82)		0.424 0.23	1.573 0.80
		0.397 (1.23)	0.571 ^{**} (3.21)		-2.498 (-1.52)	0.396 0.24	1.611 0.80

Navy Rating	Personnel Category	(ln a) Constant Term	(b) Q_m	(c) W_g/W_p	(c') W_R/W_p	$\frac{2}{R}$ S.E.E.	D-W c
BM Boatswain's Mate	I	0.223 (0.36)	** -1.616 (-2.17)	*** -9.859 (-3.74)		0.360 0.48	2.173 0.80
		0.009 (0.01)	-0.418 (-0.80)		** -10.737 (-3.23)	0.278 0.51	1.936 0.80
	II	0.309 (0.44)	0.581 (1.20)	* -3.181 (-1.83)		<u>0.32</u>	2.026 0.50
		0.307 (0.41)	*** 1.226 (4.37)		-1.375 (-1.05)	<u>0.33</u>	1.815 0.50
	III	0.228 (0.72)	0.195 (1.26)	*** -2.166 (-3.62)		0.498 0.12	2.028 0.40
		0.105 (0.33)	*** 0.595 (5.25)		-1.101 (-1.54)	0.240 0.14	1.817 0.50
	IV	0.230 (0.56)	-0.453 (-1.21)	*** -6.630 (-3.22)		0.404 0.27	2.079 0.70
		0.000 (0.00)	-0.887 (-1.34)		*** -5.639 (-3.45)	0.321 0.29	2.029 1.00

Navy Rating	Personnel Category	(ln a) Constant term	(b) Q_m	(c) W_B/W_P	(c') W_R/W_P	$\frac{2}{R}$ S.E.E.	D-W ρ
BT Boiler Technician	I	0.278 (1.33)	^{**} -1.102 (-2.79)	^{**} -5.097 (-4.21)		0.819 0.18	1.248 0.90
		0.223 (1.01)	[*] -0.682 (-2.00)		^{**} -6.471 (-3.72)	0.800 0.19	1.235 0.90
	II	0.266 (0.85)	-0.221 (-0.44)	^{**} -6.484 (-3.52)		<u>0.23</u>	2.021 0.80
		0.334 (0.96)	^{**} 1.297 (7.56)		^{**} -4.854 (-2.77)	<u>0.25</u>	1.885 0.80
	III	0.009 (0.04)	-0.036 (-0.09)	[*] -3.645 (-2.09)		<u>0.19</u>	1.974 0.90
		0.067 (0.31)	^{**} 0.751 (4.47)		^{**} -3.061 (-2.24)	<u>0.19</u>	2.033 0.90
	IV	0.101 (0.56)	[*] -0.589 (-1.79)	^{**} -5.193 (-4.65)		0.301 0.16	2.006 0.90
		0.173 (0.82)	0.283 (1.64)		^{**} -6.300 (-5.31)	0.290 0.16	1.252 0.80

Navy Rating	Personnel Category	(ln a) Constant Term	(b) Q_m	(c) W_g/W_p	(c') W_R/W_p	$\frac{2}{R}$ S.E.E.	D-W ρ
BU Builder	I	0.203 (0.30)	0.292 (0.33)	-1.360 (-0.52)		0.438 0.53	1.836 0.80
		0.160 (0.23)	0.118 (0.18)		-1.861 (-0.60)	0.441 0.53	1.780 0.80
	II	-0.260 (-0.89)	0.398 (1.24)	*** -4.546 (-4.11)		0.555 0.19	2.122 0.70
		-0.085 (-0.18)	*** 1.358 (6.33)		-1.895 (-2.17)	0.228 0.25	1.715 0.60
	III	-0.571 (-1.26)	-0.061 (-0.18)	*** -4.507 (-3.08)		0.562 0.25	1.964 0.60
		-0.232 (-0.56)	*** 0.544 (3.26)		*** -4.136 (-4.08)	0.653 0.22	2.507 0.70
	IV	-0.182 (-0.53)	-0.290 (-1.21)	*** -4.859 (-6.05)		0.370 0.16	2.019 0.50
		-0.055 (-0.25)	0.274 (1.19)		*** -4.971 (-4.23)	<u>0.19</u>	1.981 0.90

Navy Rating	Personnel Category	(ln a) Constant Term	(b) Q_m	(c) W_R/W_P	(c') W_R/W_P	$\frac{2}{R}$ S.E.E.	D-W ρ
DP Data Processing Technician	I	-0.706 (1.37)	-0.116 (-0.37)	-2.552 [*] (-2.02)		0.339 0.24	1.944 0.50
		0.751 (1.12)	0.135 (0.59)		-3.097 [*] (-1.93)	0.347 0.23	1.925 0.40
	II	0.015 (0.02)	0.425 (1.41)	-6.442 ^{***} (-5.04)		<u>0.26</u>	1.949 0.30
		0.750 (0.70)	1.226 ^{**} (3.55)		-3.579 ^{**} (-3.87)	<u>0.30</u>	2.172 0.30
	III	-0.050 (-0.28)	0.641 ^{**} (3.28)	-1.977 (-1.52)		0.755 0.16	1.884 0.90
		-0.009 (-0.05)	0.872 ^{**} (5.86)		-0.999 (-0.83)	0.734 0.17	1.927 0.90
	IV	0.046 (0.22)	-0.214 (-0.80)	-6.525 ^{***} (-4.76)		0.299 0.19	1.564 0.90
		0.123 (0.46)	0.641 ^{**} (3.03)		-5.226 ^{**} (-2.78)	<u>0.23</u>	1.684 0.90

Navy Rating	Personnel Category	(ln a) Constant Term	(b) Q_m	(c) W_B/W_P	(c') W_R/W_P	$\frac{2}{R}$ S.E.E.	D-W ρ
DS Data Systems Technician	I	-0.116 (-0.20)	0.386 (0.82)	-1.258 (-1.03)		0.50	1.81 0.90
		-0.115 (-0.20)	0.551 (1.23)		-1.028 (-0.81)	0.51	1.82 0.90
	II	3.029 (1.42)	-0.610 (-0.87)	3.029 (1.42)		0.65	1.708 0.00
		2.926 (1.33)	-0.414 (-0.59)		0.306 (0.32)	0.67	1.273 0.00
	III	0.288 (0.70)	0.954 (6.71)	0.241 (0.55)		0.19	1.990 0.50
		0.319 (0.76)	0.900 (5.82)		0.226 (0.59)	0.19	2.029 0.50
	IV	0.290 (1.62)	0.650 (4.53)	-0.289 (-0.75)		0.16	2.123 0.90
		0.291 (1.62)	0.701 (4.93)		-0.267 (-0.66)	0.16	2.097 0.90

Navy Rating	Personnel Category	(ln a) Constant Term	(b) Q_m	(c) W_B/W_P	(c') W_R/W_P	$\frac{2}{R}$ S.E.E.	D-W ρ
DT Dental Technician	I	0.233 (0.30)	0.410 (0.57)	-2.100 (-0.04)		0.67	2.14 0.90
		0.215 (0.28)	0.315 (0.49)		2.371 (0.44)	0.67	2.14 0.90
	II	0.232 (0.76)	1.123 (4.16)	-3.738* (-1.75)		0.174 0.27	1.465 0.90
		0.169 (0.47)	1.369 (4.88)		-0.178 (-0.09)	0.29	1.714 0.90
	III	-1.233 (-1.19)	1.212 (3.61)	-2.049* (-2.09)		0.308 0.30	1.834 0.00
		-0.585 (-0.64)	1.296 (4.10)		-2.007** (-2.78)	0.451 0.28	2.023 0.00
	IV	0.286 (1.09)	0.725 (3.37)	-3.235* (-1.79)		0.401 0.23	1.263 0.90
		0.272 (0.94)	0.921 (3.43)		-0.115 (-0.39)	0.330 0.25	1.447 0.90

Navy Rating	Personnel Category	(ln a) Constant Term	(b) Q_m	(c) W_B/W_P	(c') W_R/W_P	$\frac{2}{R}$ S.E.E.	D-W p
EM Electrician's Mate	I	0.117 (0.60)	*** -1.482 (-4.63)	*** -5.458 (-6.52)		0.859 0.17	1.647 0.90
		0.063 (0.30)	*** -0.972 (-3.46)		*** -6.365 (-5.81)	0.836 0.18	1.584 0.90
	II	0.032 (0.14)	0.256 (0.65)	** -3.133 (-2.68)		0.21	1.875 0.90
		0.090 (0.36)	*** 0.945 (3.47)		-1.961 (-1.43)	0.23	1.925 0.90
	III	1.144 (1.53)	-0.513 (-1.12)	** -3.903 (-2.45)		0.28	2.195 0.40
		0.000 (0.00)	-0.368 (-1.23)		-2.786 (-2.90)	0.13	1.995 1.00
	IV	0.099 (0.89)	** -0.430 (-2.44)	*** -3.817 (-7.48)		0.10	1.507 0.90
		0.000 (0.00)	-0.524 (-1.98)		*** -2.617 (-3.18)	0.581 0.12	1.793 1.00

Navy Rating	Personnel Category	(ln a) Constant Term	(b) Q_m	(c) W_B/W_P	(c') W_R/W_P	$\frac{2}{R}$ S.E.E.	D-W ρ
EN Engineman	I	0.000 (0.00)	** -2.125 (-2.78)	** -2.515 (-2.53)		0.475 0.33	1.376 1.00
		0.000 (0.00)	** -2.139 (-2.85)		** -2.628 (-2.69)	0.492 0.33	1.385 1.00
	II	0.214 (0.63)	** 0.995 (2.50)	-0.954 (-1.11)		<u>0.30</u>	1.859 0.90
		*** 4.324 (3.64)	0.049 (0.13)		-0.599 (-1.62)	<u>0.30</u>	1.421 0.20
	III	0.342 (0.72)	** 0.459 (2.78)	** -0.639 (-2.38)		0.344 0.14	2.022 0.30
		0.372 (0.76)	*** 0.562 (3.48)		* -0.493 (-2.05)	0.299 0.14	2.018 0.30
	IV	0.307 (0.98)	0.109 (0.30)	** -1.641 (-2.17)		<u>0.27</u>	1.727 0.90
		0.300 (0.89)	0.427 (1.35)		-1.145 (-1.41)	<u>0.29</u>	1.71 [^] 0.90

Navy Rating	Personnel Category	(ln a) Constant Term	(b) Q_m	(c) W_B/W_P	(c') W_R/W_P	$\frac{2}{R}$ S.E.E.	D-W ρ
ET Electronics Technician	I	0.194 (0.90)	*** -1.430 (-3.59)	*** -9.130 (-4.89)		0.834 0.19	1.481 0.90
		0.128 (0.44)	-0.229 (-0.71)		* -8.512 (-2.40)	0.708 0.25	1.257 0.90
	II	0.361 (0.18)	-0.558 (-1.01)	*** -11.802 (-3.62)		1.18	1.669 0.90
		0.000 (0.00)	* -1.119 (-1.95)		-1.979 (-1.08)	0.25	2.022 1.00
	III	0.729 (1.25)	0.276 (1.48)	*** -2.632 (-4.11)		0.522 0.14	2.049 0.20
		1.700 (2.37)	0.382 (1.71)		** -2.058 (-2.53)	0.318 0.17	1.990 0.20
	IV	0.219 (1.35)	*** -1.132 (-3.89)	*** -10.865 (-6.82)		0.816 0.14	1.969 0.90
		0.262 (0.91)	* 0.575 (2.57)		-5.697 (-1.84)	0.443 0.25	1.425 0.90

Navy Rating	Personnel Category	(ln a) Constant Term	(b) Q_m	(c) w_B/w_P	(c') w_R/w_P	$\frac{2}{R}$ S.E.E.	D-W ρ
E0	I	0.862 (0.73)	0.345 (0.67)	-0.946 (-0.72)		0.43	1.447 0.40
		0.864 (0.72)	0.497 (1.13)		-0.730 (-0.46)	0.43	1.413 0.40
	II	-0.543 (-0.75)	0.765 (2.39)	*** -3.688 (-4.00)		0.26	1.931 0.40
		-0.612 (-1.16)	1.464 (6.63)		* -2.339 (1.99)	0.29	2.009 0.60
	III	-0.241 (-0.65)	0.301 (1.44)	** -2.794 (-3.40)		0.634 0.24	2.068 0.70
		-0.236 (-0.68)	0.712 (4.26)		** -2.439 (-2.57)	0.569 0.26	2.079 0.80
	IV	-0.119 (-0.41)	0.612 (2.13)	** -1.723 (-2.24)		0.355 0.25	1.902 0.90
		-0.119 (-0.39)	0.846 (3.40)		* -1.603 (-1.85)	0.307 0.26	1.817 0.90

Navy Rating	Personnel Category	(ln a) Constant Term	(b) Q_m	(c) W_B/W_P	(c') W_R/W_P	$\frac{2}{R}$ S.E.E.	D-W ρ
FT Fire Control Technician	I	0.174 (0.51)	-0.614 (-0.96)	-5.841* (-1.96)		0.30	2.085 0.90
		0.134 (0.37)	0.123 (0.29)		-5.734 (-1.23)	0.32	1.908 0.90
	II	2.639** (2.66)	-0.305 (-1.00)	-7.561*** (-5.81)		0.411 0.23	2.001 0.20
		1.168 (1.23)	1.234 (3.92)		-3.317** (-5.02)	0.27	2.307 0.30
	III	-0.971 (-0.68)	0.527 (1.42)	-6.09*** (-3.22)		0.297 0.34	1.953 0.00
		-0.753 (-0.53)	1.182** (2.39)		-3.385** (-3.10)	0.278 0.34	1.987 0.00
	IV	0.133 (0.47)	-0.221 (-0.52)	-7.123** (-2.84)		0.25	1.989 0.90
		0.224 (0.47)	0.908** (5.21)		-4.132** (-2.10)	0.26	1.979 0.60

Navy Rating	Personnel Category	(In a) Constant term	(b) Q_m	(c) a_B/w_p	(c') w_R/w_p	$\frac{2}{R}$ S.E.E.		D-W ρ
GM Gunner's Mate	I	0.149 (0.47)	0.021 (0.05)	-5.641* (-1.90)		0.287 0.28		1.243 0.90
		0.000 (0.00)	-0.914 (-1.53)		-1.836 (-0.65)	0.367 0.26		1.099 1.00
	II	0.168 (0.69)	0.802** (3.11)	-6.617** (-2.66)		0.21		1.618 0.90
		0.000 (0.00)	-0.914 (-1.53)		-1.836 (-0.65)	0.367 0.26		1.099 1.00
III		0.141 (0.41)	0.578** (4.19)	-4.330* (-1.83)		0.428 0.18		1.53 0.60
		0.033 (0.09)	0.812** (3.73)		-0.981 (-0.63)	0.336 0.20		1.446 0.60
	IV	0.074 (0.31)	0.534** (2.73)	-5.275** (-2.47)		0.18		1.411 0.80
		0.000 (0.00)	-0.586 (-1.61)		-1.836 (-1.10)	0.227 0.16		1.58 1.00

Navy Rating	Personnel Category	(ln a) Constant Term	(b) Q_m	(c) \hat{w}_g/\hat{w}_p	(c') \hat{w}_R/\hat{w}_p	$\frac{2}{R}$ S.E.E.	D-W ρ
HT Hull Maintenance Technician	I	0.248 (0.87)	*** -1.385 (-3.09)	*** -6.737 (-4.70)		0.688 0.25	1.571 0.90
		0.000 (0.00)	** -1.363 (-2.25)		** -5.768 (-2.86)	0.646 0.26	1.582 1.00
	II	0.267 (0.52)	0.391 (1.08)	*** -4.485 (-3.37)		<u>0.23</u>	1.902 0.50
		1.822 (1.79)	0.877 (2.61)		-0.944 (-1.19)	<u>0.30</u>	1.444 0.30
	III	0.404 (1.14)	** -0.603 (-2.32)	*** -6.642 (-5.42)		0.644 0.20	2.109 0.60
		0.757 (1.17)	* 0.420 (1.95)		*** -3.102 (-3.90)	0.489 0.23	1.938 0.40
	IV	0.067 (0.52)	*** -0.858 (-4.44)	*** -6.969 (-9.86)		0.804 0.11	2.178 0.90
		0.000 (0.00)	** -0.832 (-2.29)		*** -4.699 (-4.65)	0.621 0.16	1.55 1.00

Navy Rating	Personnel Category	(ln a) Constant Term	(b) Q_m	(c) W_B/W_P	(c') W_R/W_P	$\frac{2}{R}$ S.E.E.	D-W ρ
IC Interior Communications Technician	I	0.225 (0.86)	-0.775 (-1.64)	** -6.603 (-2.98)		0.709 0.23	1.308 0.90
		0.000 (0.00)	-0.659 (-1.17)		-4.288 (-1.13)	0.676 0.24	1.339 1.00
		0.369 (1.43)	-0.387 (-0.81)	*** -10.563 (-3.73)		0.22	1.893 0.90
	II	0.366 (1.07)	*** 1.202 (4.79)		-1.826 (1.32)	0.28	2.045 0.90
		0.292* (1.75)	0.090 (0.37)	** -5.114 (-2.63)		0.676 0.15	1.567 0.90
		0.413* (1.99)	*** 0.737 (7.40)		-2.025** (-2.11)	0.656 0.15	1.895 0.80
	IV	0.000 (0.00)	-0.430 (-1.22)	-3.817 (-1.58)		0.737 0.15	1.388 1.00
		0.504** (2.46)	*** 0.503 (3.17)		-3.776** (-2.52)	0.671 0.17	1.246 0.90

Navy Rating	Personnel Category	(ln a) Constant Term	(b) Q_m	(c) W_B/W_P	(c') W_R/W_P	$\frac{2}{R}$ S.E.E.	D-W ρ
MM Machinist's Mate	I	0.000 (0.00)	-1.416 (-1.70)	* -6.089 (-2.14)		0.662 0.35	1.879 1.00
		0.000 (0.00)	-1.492* (-1.83)		-5.905* (-2.26)	0.669 0.34	1.933 1.00
	II	0.160 (0.46)	*** 1.393 (5.16)	* -4.963 (-1.79)		0.433 0.30	1.680 0.90
		0.000 (0.00)	-0.254 (-0.34)		-2.153 (-0.78)	0.424 0.30	1.781 1.00
	III	-0.221 (-0.20)	* 0.718 (1.98)	-0.419 (-0.18)		0.245 0.27	2.036 0.20
		-0.181 (-0.14)	* 0.705 (2.01)		-0.158 (-0.11)	0.264 0.27	2.012 0.20
	IV	0.205 (0.81)	*** 0.830 (4.22)	*** -8.116 (-4.42)		0.755 0.22	1.048 0.90
		0.152 (0.43)	** 1.014 (2.32)		-2.394 (-1.02)	0.517 0.31	1.198 0.90

Navy Rating	Personnel Category	(ln a) Constant Term	(b) Q_m	(c) W_B/W_P	(c') W_P/W_P	$\frac{2}{R}$ S.E.E.	D-W p
MR	Machinery Repairman	I	0.306 (0.99)	^{**} -1.319 (-2.59)	^{***} -8.266 (-3.72)	0.580 0.27	1.589 0.90
			0.233 (0.67)	-0.276 (-0.77)	^{**} -8.495 (-2.64)	0.466 0.31	1.509 0.90
	II		0.259 (0.90)	-0.025 (-0.06)	^{***} -7.652 (-3.26)	<u>0.25</u>	1.819 0.90
			0.000 (0.00)	-0.685 (-1.00)	-0.992 (-0.38)	<u>0.27</u>	2.440 1.00
	III		0.124 (0.55)	0.328 (1.92)	[*] -2.439 (-1.85)	0.559 0.15	1.879 0.70
			0.352 (0.63)	^{***} 0.563 (3.19)	-1.583 (-1.64)	0.488 0.16	1.361 0.30
	IV		0.244 (1.27)	^{**} -0.692 (-2.48)	^{***} -8.067 (-5.48)	0.596 0.17	1.519 0.90
			0.212 (0.73)	0.426 (1.76)	[*] -5.335 (-1.83)	<u>0.25</u>	1.617 0.90

navy rating	Personnel Category	(ln a) Constant Term	(b) Q_m	(c) W_B/W_P	(c') \ddot{W}_R/\ddot{W}_P	$\frac{2}{R}$ S.E.E.	D-W ρ
OS Operations Specialist	I	0.078 (0.28)	-0.338 (-0.98)	^{**} -2.590 (-2.56)		0.649 0.24	1.652 0.90
		0.059 (0.20)	0.028 (0.10)		[*] -2.371 (-1.97)	0.606 0.26	1.580 0.90
	II	0.165 (0.51)	0.104 (0.26)	[*] -2.691 (-2.02)		0.492 0.28	1.771 0.90
		0.147 (0.41)	^{**} 0.693 (2.53)		-0.836 (-0.71)	0.393 0.31	1.755 0.90
	III	0.226 (0.70)	^{***} 0.693 (4.59)	^{***} -1.683 (-3.17)		<u>0.14</u>	2.074 0.50
		0.123 (0.35)	^{***} 1.009 (8.40)		^{**} -1.436 (-2.27)	<u>0.16</u>	2.005 0.50
	IV	0.228 (1.58)	[*] 0.299 (1.78)	^{***} -1.909 (-3.52)		<u>0.13</u>	2.154 0.90
		0.235 (1.38)	^{***} 0.633 (4.53)		[*] -1.339 (-2.07)	<u>0.15</u>	1.930 0.90

Navy Rating	Personnel Category	(ln a) Constant Term	(b) Q_m	(c) W_B/W_P	(c') W_R/W_P	$\frac{2}{R}$ S.E.E.	D-W ρ
PH Photographer	I	0.305 (0.89)	[*] -0.790 (-1.88)	^{**} -3.743 (-3.08)		0.569 0.30	1.958 0.90
		0.277 (0.76)	-0.285 (-0.81)		^{**} -3.584 (-2.44)	0.505 0.32	1.855 0.90
	II	0.313 (0.62)	0.399 (0.84)	[*] -3.312 (-1.90)		<u>0.38</u>	2.634 0.80
		0.266 (0.51)	^{**} 1.128 (4.58)		-2.371 (-1.40)	<u>0.39</u>	2.633 0.80
	III	0.287 (1.34)	0.372 (1.61)	^{**} -2.203 (-2.51)		<u>0.19</u>	2.010 0.90
		0.271 (1.12)	^{**} 0.793 (4.28)		-1.067 (-1.06)	<u>0.21</u>	1.973 0.90
	IV	0.337 (1.42)	-0.032 (-0.11)	^{**} -2.810 (-3.20)		0.596 0.21	2.074 0.90
		0.329 (1.20)	[*] 0.491 (2.19)		-1.904 (-1.83)	0.467 0.24	1.942 0.90

Navy Rating	Personnel Category	(ln a) Constant Term	(b) Q_m	(c) w_B/w_p	(c') w_R/w_p	$\frac{2}{R}$ S.E.E.	D-W ρ
PN Personnelman	I	0.000 (0.00)	^{**} -1.863 (-2.21)	^{**} -3.897 (-2.17)		0.654 0.36	1.759 1.00
		0.000 (0.00)	^{**} -1.861 (-2.26)		^{**} -4.182 (-2.36)	0.667 0.35	1.809 1.00
	II	0.249 (0.83)	0.492 (1.36)	^{**} -2.141 (-2.69)		<u>0.26</u>	1.873 0.90
		0.235 (0.70)	^{**} 1.169 (4.50)		-2.271 (-1.58)	<u>0.29</u>	1.756 0.90
	III	0.325 (1.30)	^{**} 0.377 (2.78)	^{**} -1.704 (-3.14)		<u>0.14</u>	2.049 0.60
		0.303 (0.93)	^{**} 0.691 (6.17)		^{**} -1.685 (-2.25)	<u>0.15</u>	1.934 0.50
	IV	0.366 (1.28)	-0.253 (-0.76)	^{**} -3.372 (-3.28)		0.621 0.25	1.703 0.90
		0.362 (1.14)	0.309 (1.14)		^{**} -2.796 (-2.27)	0.529 0.28	1.521 0.90

Navy Rating	Personnel Category	(1n a) Constant Term	(b) Q_m	(c) W_B/W_P	(c') W_R/W_P	$\frac{2}{R}$ S.E.E.		D-W ρ
PR Aircrew Survival equipmentman	I	0.398 (1.37)	-0.048 (-0.17)	^{**} -4.298 (-2.20)		0.693 0.25		1.801 0.90
		0.362 (1.17)	0.453 [*] (1.79)		-3.132 (-1.46)	0.652 0.27		1.665 0.90
	II	0.276 (0.96)	0.935 ^{**} (3.65)	^{**} -5.546 (-2.63)		<u>0.25</u>		1.538 0.90
		0.223 (0.71)	1.543 ^{**} (5.47)		-3.238 (-1.68)	<u>0.27</u>		1.762 0.90
	III	0.376 (1.67)	0.712 ^{**} (8.25)	^{**} -3.477 (-3.07)		0.480 0.14		2.178 0.70
		0.302 (1.29)	1.097 ^{**} (6.61)		^{**} -2.575 (-2.53)	0.416 0.15		2.208 0.70
	IV	0.360 (1.70)	0.529 ^{**} (3.01)	^{**} -5.039 (-3.45)		0.386 0.18		1.451 0.90
		0.324 (1.31)	1.030 ^{**} (4.50)		[*] -3.018 (-2.02)	<u>0.21</u>		1.488 0.90

Navy Rating	Personnel Category	(ln a) Constant Term	(b) Q_m	(c) W_g/W_p	(c') W_R/W_p	$\frac{2}{R}$ S.E.E.	D-W ρ
QM Quartermaster	I	0.225 (0.73)	*** -0.548 (-3.15)	*** -3.188 (-3.15)		0.659 0.27	1.620 0.90
		0.199 (0.61)	-0.151 (-0.47)		** -3.244 (-2.68)	0.624 0.28	1.537 0.90
	II	0.504 (0.73)	0.299 (0.74)	*** -3.557 (-2.91)		0.28	1.989 0.40
		0.749 (0.84)	** 1.124 (3.67)		-1.639 (-1.31)	0.33	1.572 0.40
	III	0.033 (0.24)	*** 0.440 (2.90)	** -1.103 (-2.10)		0.780 0.12	1.304 0.90
		0.074 (0.52)	*** 0.629 (5.62)		* -1.026 (-1.73)	0.765 0.13	1.386 0.90
	IV	0.128 (0.64)	-0.049 (-0.20)	* -2.748 (-3.95)		0.448 0.18	2.052 0.90
		0.182 (0.81)	* 0.350 (1.72)		*** -2.671 (-2.99)	0.311 0.20	1.765 0.90

Navy Rating	Personnel Category	(ln a) Constant Term	(b) Q_m	(c) W_B/W_P	(c') W_R/W_P	$\frac{2}{R}$ S.E.E.	D-W ρ
RM Radioman	I	0.000 (0.00)	^{**} -1.396 (-2.54)	^{**} -3.261 (-2.69)		0.729 0.23	1.705 1.00
		0.000 (0.00)	^{**} -1.408 (-2.61)		^{**} -3.362 (-2.82)	0.737 0.23	1.780 1.00
	II	0.051 (0.24)	[*] 0.523 (1.97)	^{***} -3.582 (-4.07)		0.402 0.19	1.596 0.90
		0.093 (0.31)	^{***} 1.257 (5.44)		-1.374 (-1.41)	<u>0.25</u>	1.589 0.90
	III	0.797 (1.30)	^{**} 0.482 (2.30)	[*] -0.970 (-1.93)		<u>0.18</u>	2.323 0.30
		0.889 (1.37)	^{***} 0.618 (2.90)		-0.533 (-1.17)	<u>0.19</u>	2.292 0.30
	IV	0.120 (0.64)	0.077 (0.35)	^{***} -3.062 (-4.30)		<u>0.16</u>	1.776 0.90
		0.163 (0.71)	^{***} 0.573 (2.97)		^{**} -2.352 (-2.65)	<u>0.20</u>	1.542 0.90

Navy Rating	Personnel Category	(In a) Constant Term	(b) Q_m	(c) W_B/W_P	(c') W_R/W_P	$\frac{2}{R}$ S.E.E.	D-W ρ
SH Ship's Serviceman	I	0.100 (0.32)	-0.512 (-1.52)	*** -3.472 (-3.68)		0.555 0.24	2.004 0.80
		0.024 (0.09)	-0.176 (-0.62)		*** -3.584 (-3.31)	0.516 0.25	2.063 0.90
	II	0.678 (1.03)	0.233 (0.67)	*** -3.042 (-2.85)		<u>0.24</u>	2.025 0.40
		0.650 (0.87)	*** 0.959 (3.90)		* -2.237 (-1.71)	<u>0.27</u>	1.649 0.40
	III	0.009 (0.02)	*** 0.453 (2.21)	*** -1.991 (-2.76)		0.351 0.16	1.995 0.40
		-0.199 (-0.45)	*** 0.895 (6.29)		*** -2.641 (-2.82)	0.359 0.16	1.991 0.40
	IV	0.798 (1.62)	-0.141 (-0.74)	*** -2.827 (-4.85)		<u>0.14</u>	2.188 0.30
		0.613 (1.04)	* 0.314 (1.77)		*** -3.351 (-3.72)	<u>0.16</u>	2.007 0.30

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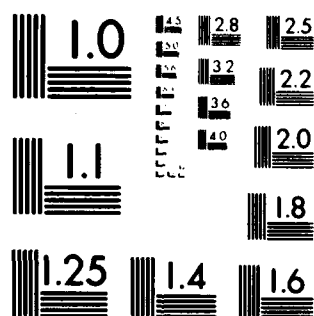
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Navy Rating	Personnel Category	(In a) Constant Term	(b) Q_m	(c) W_B/W_P	(c') W_R/W_P	$\frac{2}{R}$ S.E.E.	D-W ρ
SK Storekeeper	I	0.788 (1.29)	-1.547 (-1.29)	-6.716 (-1.63)		0.45	2.034 0.80
		0.586 (0.92)	-0.163 (-0.16)		-3.449 (-0.54)	0.48	1.978 0.80
	II	0.214 (0.61)	0.379 (0.45)	-4.106 (-1.20)		0.30	1.915 0.90
		4.258 (3.61)	0.124 (0.32)		-0.037 (-0.05)	0.29	1.548 0.20
	III	-1.698 (-1.42)	0.149 (0.32)	^{***} -6.375 (-3.90)		0.614 0.30	2.022 0.20
		0.124 (0.34)	0.795 (1.76)		0.545 (0.16)	0.31	1.813 0.90
	IV	0.269 (0.85)	-0.848 (-1.10)	^{**} -6.692 (-2.17)		0.27	2.104 0.90
		-0.432 (-0.46)	^{**} 0.806 (2.59)		-2.641 (-1.98)	0.519 0.33	1.905 0.40

SN	Rating	Personnel Category	(1n a) Constant Term	(b) Q_m	(c) W_B/W_P	(c') W_R/W_P	$\frac{2}{R}$ S.E.E.	D-W ρ
SM	Signalman	I	0.145 (0.41)	-1.346 [*] (-2.32)	-6.408 [*] (-3.52)		0.705 0.31	2.196 0.90
			0.098 (0.26)	-0.841 (1.63)		-7.807 [*] (-3.03)	0.742 0.33	1.909 0.90
		II	0.819 (1.00)	0.482 (1.05)	-3.113 [*] (-1.94)		0.30	2.074 0.40
			0.303 (0.43)	1.337 [*] (5.54)		-2.024 (-1.01)	0.31	2.154 0.50
		III	0.106 (0.14)	0.218 (0.60)	-2.538 [*] (-1.74)		0.346 0.27	1.962 0.40
			-0.247 (-0.34)	0.850 [*] (3.43)		-4.270 ^{**} (-2.19)	0.397 0.26	2.045 0.00
		IV	0.132 (0.71)	-0.597 [*] (-2.08)	-5.118 ^{***} (-5.13)		0.817 0.16	1.775 0.90
			0.180 (0.77)	0.273 (1.26)		-4.321 ^{***} (-3.25)	0.716 0.20	1.510 0.90

NOTE: The above analysis includes 296 regression equations. In 26 of these (8.8%), estimations are based on $\rho = 1$. In these cases, the effect of homoskedasticity in the residuals is to be considered:

If the untransformed error terms are U_i and the transformed residuals ϵ_i , where $U_i = \rho U_{i-1} + \epsilon_i$ for $\rho < 1$:

$$U_i = \rho U_{i-1} + \epsilon_i = \rho (\rho U_{i-2} + \epsilon_{i-1}) + \epsilon_i$$

Continuing to expand yields:

$$U_i = \epsilon_i + \rho \epsilon_{i-1} + \rho^2 \epsilon_{i-2} + \dots$$

$$= \sum_{r=0}^{\infty} \rho^r \epsilon_{i-r}$$

$$E(U_i) = \sum_{r=0}^{\infty} \rho^r E(\epsilon_{i-r}) = 0$$

which indicates that the transformed residuals have a mean of zero.

$$E(U_i^2) = E(\epsilon_i^2) + \rho^2 E(\epsilon_{i-1}^2) + \rho^4 E(\epsilon_{i-2}^2) + \dots$$

$$\sigma_U^2 = (1 + \rho^2 + \rho^4 + \dots) \sigma_\epsilon^2$$

The problem of heteroskedasticity in the residuals arises when $\rho = 1$ and the number of terms is infinite.¹ Fortunately, we have only 22 terms and examination of the scatter diagrams of the residuals does not indicate a heteroskedasticity problem.

¹See William C. Merrill and Karl A. Fox, Introduction to Economic Statistics, Wiley, New York, 1970, pp. 413-414.

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✓ Pay, (2) by Regular Military Compensation plus reenlistment bonuses and compared to earnings in an equivalent civilian occupational classification. The effect of changes in relative military-civilian compensation on voluntary separation is computed for 37 Navy ratings by personnel categories (based on length of active service) using 1973-78 data from the Department of Defense Manpower Data Center and the Department of Labor. Also computed are business-cycle quit elasticities (effect of changes in general economic conditions on voluntary separation).

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